

**DEVELOPMENT OF AGRICULTURE VALUE CHAINS AS AN ASSET FOR THE
SUSTAINABLE DEVELOPMENT AND FOOD SECURITY: THE CASE OF THE
IMPROVEMENT OF AGRICULTURAL AND TECHNICAL AND VOCATIONAL
EDUCATION IN SENEGAL**

Ousmane KANE

Dissertation to obtain the degree of Doctor of Philosophy presented to the professors

from the Department of Agriculture, Leadership, and Community Education (ALCE).

Discipline: Teaching and Learning in Agriculture

Virginia Polytechnic Institute and State University

Committee Members

Donna Westfall-Rudd, Chair

Amadou Ndiaye

Tiffany Drape

Ya cor Dion

May 24, 2021

Blacksburg, Virginia

Keywords: Teachers, program, agriculture value chains, sustainable, development, agricultural technical and vocational education, Bambey, Thies, Senegal

Copyright © 2021, Ousmane Kane

Abstract academic

The growth of a country depends on the improvement of its human resources. The TVET (Technical and Vocational Education and Training) system intends primarily to advance personal support and resources. Throughout education, people can build their knowledge, understanding, and skills to find a job. The TVET in Agriculture (ATVET) curriculum plays an essential role in designing interventions to deliver quality education, helping people increase productivity in the various agriculture sectors of economic activities, value chains, and associated occupations. The purpose of this research is to investigate what is necessary to improve the agriculture technical and vocational education programs in Senegal by focusing on pedagogy and teaching strategies. Participants represented different ranges of teaching experience from five to more than ten years. The lead researcher interviewed two school directors and ten ATVET teachers. The interviews were semi-structured and were last from 30 minutes to one hour in Diourbel and Thies, Senegal. The researchers developed an interview protocol regarding the ATVET programs, implementation issues, and job market trends. The results showed that participants had various years of professional experience in the ATVET system and academic levels. All participants are well experienced and knowledgeable about working in strenuous physical and instructional conditions. The lack of infrastructure, equipment, and class facilities appears in the findings as significant problems. The deterioration of the resources such as human, material, financial and organizational influences the expected teaching outcomes because of insufficient and inadequate teaching and learning methods. Thereby, all authorities must consider the requirements and expectations of the the competency-based (CBA) program within the sustainability of the infrastructure, the learning environment, and the efficiency of maintenance to improve the technical context to guarantee practical and efficient administration of technological, environmental, and human resources.

General Audience Abstract

The growth of a country depends on the improvement of its human resources. The Vocational Training system (TVET) aims to strengthen human resources. Through education, people can build their expertise, comprehension, and abilities to find a job. The TVET in Agriculture performs a fundamental function in designing interventions to deliver concerning training, making people boost productivity in agriculture sectors of economic activities, value chains, and associated occupations. The purpose of this research is to investigate what is needed to improve agriculture vocational and technical education programs in Senegal by focusing on pedagogy and teaching strategies to address the new and growing competency demands of the different value-chains within the agriculture system. Participants in this study were the teachers and administrators in the current ATVET programs. The lead researcher interviewed two school directors and ten ATVET teachers in Diourbel and Thies, Senegal. The researchers developed an interview protocol regarding the ATVET programs, implementation issues, and job market trends. The results showed that participants are well experienced and knowledgeable about working in strenuous physical and instructional conditions. The availability and quality of material resources such as teaching materials and class sizes pose problems in teacher satisfaction in the classroom to boost learning outcomes. Thus, the didactic equipment also remains insufficient and poorly diversified, which testifies the limited pedagogical approaches used in these structures. The deterioration of the ATVET resources such as human, material, financial and organizational influences the expected teaching outcomes because of insufficient and inadequate teaching and learning methods. Thereby, all authorities must consider the requirements and expectations of sustainability of the infrastructure, the learning environment, and the efficiency of maintenance to improve the technical context.

Dedications

TO MY PARENT REGRETS: my father, my mother and my grandmother How to forget you? Your kindness will permanently be engraved in my memory, and I imagine what your joy would be today. I would have liked you to witness the culmination of these years of hard work but God the Almighty has decided otherwise. Your prayers and your Blessing have been of great help to me throughout my life and academic career. Whatever I may say and write, I could not express my deep affection and deep gratitude. I hope I never disappoint you nor betray your wish until God reunites us in the Hereafter. May God grant you eternal peace and welcome you to his eternal paradise. REST IN PEACE!

TO MY VERY DEAR CHERIE NDEYE AWA. No dedication could express my love and attachment to you. Since I knew you, you have never stopped supporting me and helping me. You always wanted the best from me. Also, your love has only given me confidence and stability. No words could express my gratitude, love, and respect. I thank the good God who crossed our paths. May the good God give us health and long life.

TO MY DEAR DAUGHTER OUMY. I love you, my daughter. May all God protect you and give you long life. This work is dedicated to you because no dedication can express the depth of fraternal feelings and attachment you have.

TO MY CHERIE FATOUMATA. I thank the good Lord who brought us together. God protects you, keeps you, and strengthens our fraternity. I express my attachment, love, and gratitude to you. You still want the best and the best from me. Besides, please find here the assurance of my deep respect and my faithful attachment. May God grant you health and long life.

TO MY LOVELY BROTHER ABDOU. I will not know how to translate on paper the affection I have for You, and I will never forget these wonderful moments spent together.

Intelligent that you are, I implore Allah to reserve a future for you. No dedication can express the depth of brotherly feelings and attachment that I have for you. I consecrate this scientific product to Abdou as a testimony of my deep affection in memory regarding our unwavering union that has been woven over the years. May God protects, keeps, and strengthens you. I wish you all the happiness in the world.

TO MY BIG SISTER AND HER CHILDREN. To my family, I have always felt at home and who have always considered me one of their own. Expressions betray me, and I cannot express my attachment, love, and gratitude for you. Allow me to say to you through this work my respect and my deep appreciation. Please find here the assurance of my deep respect and my faithful attachment. May God bless you and grant you a long life full of joy and success.

TO ALL MY LOVELY NDIAYE FAMILY. May this work be for you a testimony of my respect and my love. May this work also be a demonstration of my deep affection for you. You have always listened to me, supported me, and helped me tirelessly, and I hope this work can express my deep respect to you and be a symbol of how I feel about you. May God bless you and grant you a long life full of joy and success.

TO MY FRIENDS AND COLLEAGUES. It would be difficult for me to quote you all. You are in my heart and affectionately. I was hoping you could find here the assurance of my deep respect and steadfast attachment. May this work be the symbol of how I feel towards you. May God bless you and grant you a long life full of joy and success.

Acknowledgements

I exhibit my thankfulness to the government of Senegal throughout the Ministry of Higher Education, Research, and Innovation. I express my gratitude to the president of Alioune Diop University in Bambey and Prof. El Hadji Faye, director of the Higher Agriculture Institute for Training in Bambey. I want to acknowledge Dr. Abdoulaye Faye, Department Head of Animal Productions, for consistently supported me throughout this journey. Thanks to Virginia Polytechnique Institute and State University through the Department of Agriculture, Leadership, and Community Education (ALCE) for funding my doctoral study program and research.

I want to confess my straightforward thanks and gratitude to Dr. Donna Westfall-Rudd, my doctoral thesis supervisor in the Agriculture, Leadership, and Community Education Department at Virginia Tech. My warm thanks to her for allowing me to do this Ph.D. by agreeing to mentor me in this study program. She supported, accompanied, and guided me on this journey of challenges. Dr. Westfall-Rudd is an academic mentor and a friend, counselor, mother, and guide. Your sense of excellence allowed me to succeed in this not-so-simple journey, thanks to your availability, thoroughness, objective criticisms, and relevant comments. You have always given me the best advice for success in my study program and my social life. She introduced me to scientific research in agricultural education, and I was surprised to find that I had a particular interest in the field. Your comments and criticisms have been handy to me in improving my research implementation. Through it, I thank all the professors and the said department staff for your availability, encouragement, and confidence that you have brought in me through my stay in this Ph. D program.

I am thankful and satisfied to the scientific committee members for their enrichment of this work and, more generally, my academic success. I would like to thank Dr. Amadou Ndiaye,

Dr. Ya Cor Dion, and Tiffany Drape for your availability, help, and relevant comments to perfect my research activities. You shared your knowledge and experiences in this environment while granting me your confidence and a significant degree of independence in the execution of my research program. A warm and special thank you to Dr. Rick Rudd for his patience, availability, and above all, his informed advice, which contributed to my reflection in choosing this research theme for the writing of my doctoral dissertation. It taught me a lot about the challenges in the world of teacher education. Your encouragement, guide, advice, and support made it easier to choose my research questions. Thank you all for having me open your doors at all times that I asked you. I also thank all the professors of the said department who contributed my training and social support, facilitating my academic success.

Also, I must warmly thank all the teachers and administrators of vocational and technical training institutes who kindly took part in this study. I am very grateful for their time and kindness, which greatly contributed to the successful conduct of this research. Thanks to you, the field study which was at the heart of our work has been enriched. I would like to thank you for having responded despite your very busy schedules and who made themselves available to come and listen to me, discuss and share your professional experience. Besides, I am thankful to all my friends from Senegalese. I have pleasant moments with you on the campus and in the town of Blacksburg. I can't finish without thanking those who contribute directly or indirectly to this accomplishment, and I did not mention it.

Hokie, Hokie, Hokie for ever!

Table of Contents

Abstract academic	v
General Audience Abstract	vi
Dedications	iv
Acknowledgements	vi
List of Figures	xi
List of Tables	xii
Chapter 1: Introduction	1
Problem Statement	2
Purpose and research questions	4
Theoretical Framework	4
Program planning models	4
Significance of the study	5
Definition of terms	7
Chapter 2: Literature review	9
Program Planning Theory	9
Elaborating Program to implementing Activities	15
Growth of the youth population	18
TVET in the educational system	22
Types of TVET in Senegal	24
TVET and Job Market in in Francophone countries of West Africa	25
Partnership between TVET, industry, and financial society	30
Improving the TVETs' students' enrollment	31
Opportunities of TVET system	33
Pedagogical approaches in the TVET system	34
Competency approach	35
Links between curriculum and pedagogy	37
Chapter 3:	39
Purpose and research questions	39
Using a Case Study as a qualitative design	39
Site Selection	41
Participant selection	42
Data Collection	43

Interviews	48
Data Analysis	49
Strategies for Validating Findings	50
Limitations and Research Subjectivity	51
Chapter 4: Findings	53
<i>Research question 1: What teaching activities do instructors utilize in the Technical and Vocational Education Program in Senegal?</i>	54
Classroom process: resources, organization, management, and teaching methods	55
Up-to-date equipment, course materials, and infrastructures.....	73
Complex issues and challenges of the competence-bases program	77
Acquire a valuable educational experience and good service quality.....	79
Hands-on training in the learning processes	82
<i>Research question 3: How do teachers see the educational experiences influencing the employment and career opportunities of the graduates of TVET programs in agriculture?</i>	86
Effectiveness of the student training program	86
Knowledge and skill Applications in the fields	88
<i>Research question 4: How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?</i>	93
Planning and managing activities and times, and other resources to achieve teaching	93
and learning goals	93
State and school authorities' consideration and funding.....	97
Professional development of teachers.....	99
Future of ATVET, its functions, and goals.....	105
Chapter 5: Discussion and Recommendation	107
Discussion	109
<i>Research question 1: What teaching activities do instructors utilize in the Technical and Vocational Education Program in Senegal?</i>	109
Organization, management, and teaching methods.....	109
Financial means, school managements, environmental conditions, and relationship	117
<i>Research question 2: How do teachers describe the learning experiences of the graduates of TVET programs in agriculture?</i>	123
Relationships and Participation of students	123
Course Content, instruction, and environments of the classroom.....	125
Student learning, evaluation, and labor markets	128
<i>Research question 4: How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?</i>	133

Resources and financial means	133
Infrastructure, equipment, and management	135
Pedagogical competency training needs	137
Final certification	138
Using Program Planning to support the results	139
Conclusion	141
Recommendations	144
Recommendation for Further Research	149
Educational implication and significance	150
Summary	152
References	155
Appendix	164
Appendix A: French Interview protocole	164
Appendix B: Interview protocol	166
Appendix C: Script of conversation	168
Appendix D: French Script	169
Appendix E: Consent to participate	170

List of Figures

<u>Figure 1:</u> Program Planning Competences and Quality of Training Processes.....	18
---	----

List of Tables

<u>Table 1:</u> Participants' Characteristics.....	43
<u>Table 2:</u> a set of a priori propositions.....	45

Chapter 1: Introduction

In general, it is accepted that the growth of a country depends on the improvement of its human resources, and it is the primary aim of the TVET (Agricultural Vocational Education and Training) education system. Through education, people can develop their knowledge and skills to find a job (Ajithkumar, 2016; Kraak & Paterson, 2016). This situation implies that any nation cannot have economic advancements as expected without a reliable and practical education system that can provide the required competencies and skills for people to participate in national development. In this sense, the development can be seen as the achievement of economic fullness, driving the economic competitiveness and a great model of existence and self-reliance. This context may account for why Kraak & Paterson (2016) explained the need to create on-the-job learning spaces for TVET students to improve youth employment probabilities for national economic development. Thereby they can bring about change and contribute to the economic development of communities.

The Agricultural Vocational Education and Training (TVET) presents an essential purpose in design interventions to produce concerning learning, advancing people for more production in agriculture sectors of commercial and industrial activities, value chains, and associated occupations (Ismail, & Mohammed, 2015). The TVET is defined in many different ways. According to UNESCO,

“...Technical and Vocational Education refers to all forms and levels of the educational the process involving, in addition to general knowledge, the study of technologies and related sciences and the acquisition of practical skills, know-how, attitudes and understanding relating to occupations in the various sectors of economic and social life” (UNESCO, 1989, p. 2).

In other words, it is an educational and training that provides opportunities for people for remunerative employment. The importance of (TVET) in nation-building cannot be overemphasized (Oketch, 2007; Keating, 1994). Indeed, the TVET is a principal factor for

industrial evolution and the social advancement of any nation (Badenhorst, & Radile, 2018; Fedorov, & Davydova, 2014). Without an experienced and knowledgeable workforce produced by the TVET for the industry, commerce, and agriculture, state advancement would essentially grind to a cessation (Khasawneh, Miqdadi, & Hijazi, 2014). A common thread in developing countries, specifically in Senegal, is TVET programs that are outdated, lack infrastructure, have minimal materials, face educational constraints, are under-resourced, and are not very relevant to the economic, job markets, and environmental challenges of these countries (Badenhorst, & Radile, 2018; Kirior, 2017).

The principal goal of the TVET system is to afford youth with the technological and professional abilities demanded social and economic development as future entrepreneurs and self-employed individuals (Hassan, B., & Maizam, A. (2017; Chukwunwendu, 2015; Fedorov, & Davydova, 2014; Constant et al., 2014; Union, 2007). However, the quality of class instruction and learning has remained to weaken, and this lack of training becomes a problem because people are practicing agriculture and forestry techniques in ways that are not productive and sustainable (Mack, & White, 2019; Badenhorst, & Radile, 2018; Balamurugan, & Balasubramanian, 2017; Schut et al., 2016; Reardon et al., 1999). The lack of training of producers are the primary reason that agricultural resources are not managed using sustainable practices (Šūmane et al., 2018; Balamurugan, & Balasubramanian, 2017).

Problem Statement

The TVET system is used to acquire skills to find decent and sustainable employment to meet these needs. It must therefore, meet the needs of job seekers and the expectations of the professional world (Lamichhane, 2017; Konayuma, 2012). A successful vocational training system must also lead to a supply of qualified human resources of workers, specialists, and managers in order for the economy to be efficient and competitive (Lilly, &

Efajemue, 2011). The improvement of TVET systems all over the world is a fundamental request in a time of social and economic change for sustainable development. Indeed, in Senegal, vocational training is taking place in the context of a sharp increase in the young population, the decrease in job opportunities in the public service, an increase in competition between job seekers in the private labor market, and sustained growth in the informal sector (Liu, Liu, & Hariyanto, 2020; Lowitt, et al., 2015). In many sectors of the economy, the demands on the workforce are changing rapidly with the diversification of job vacancies. From these issues in TVET, we have witnessed a theoretical gap, particularly a necessity to adequately comprehend the challenges connected with the TVET curriculum and pedagogical strategies. As such, the potential approaches for efficiently managing sustainable transformation faced by TVET institutes, with a focal concentration on curriculum reform, need to be examined (Mukhtar, & Ahmad, 2015).

Likewise, the improvement of the pedagogical quality in vocational teacher education constitutes an important element and has a role in achieving the supply of adequately skilled workers in this context of change (Okoye, & Okwelle, 2013). The vocational teaching profession needs to be reviewed to meet the needed pedagogical professional profile. It consolidates to make sure that vocational teachers have the necessary competencies to fulfill the new era requirements and facilitate the process of vocational teacher education (Omar, et al., 2018; Ramadan, Chen, & Hudson, 2018); Paryono, P. (2015). Therefore, vocational training that does not adapt to these requirements immediately contributes indirectly to generating high unemployment and increasing economic and social polarization of the population, which can lead to serious economic, political, social, and ecological crises. Despite significant efforts to strengthen TVET, it remains characterized by obsolete or damaged infrastructure and insufficient human resources.

Purpose and research questions

This research proposal is to investigate what needs to be done to improve agriculture TVET (Agricultural Vocational Education and Training) programs in Senegal by focusing on pedagogical aspects and teaching strategies to address the new growing competency demands of the different value-chains within the agriculture system in Senegal. Indeed, ATVET should be improved into a better plan, especially when the country needs to introduce new educational programs and competencies for teachers TVET and staff to improve the training opportunities offered to local producers, students, and industrials the competency demands of the different value-chains within the agriculture system. The four main questions guided this study:

1. What teaching activities do instructors utilize in the Technical and Vocational Education Programs in Senegal?
2. How do teachers describe the learning experiences of the graduates of TVET programs in agriculture?
3. How do teachers see the educational experiences influencing the employment and career opportunities of the graduates of TVET programs in agriculture?
4. How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?

Theoretical Framework

Program planning models

Many program planning models exist, such as Caffarella and Daffron (2013), Caffarella and Daffron (2011), Cervero and Wilson (2006), and Uhland model (1994). Cervero and Wilson (2006) define program planning as “*a social activity whereby people construct educational programs by negotiating personal, organizational, and social interests in contexts marked by socially structured relations of power. The four concepts that structure*

the theory..., and describe their ethical obligations" (p. 24). Caffarella's (2002) planning programs for adult learners provide educators, trainers, and staff designers a practical guide to develop a professional development program. Caffarella and Daffron (2011) explained the planning model by stressing that "*...in essence means planning programs primarily in a step-wise progression, where you move logically through the planning process*" (p. 77). Caffarella (2010) characterized the program planning model as shared ideas how the curriculum is placed unitedly and the necessary components to guarantee success. Baskas (2011) cited Uhland model (1994) defined the process as "process associated with designing, developing, and implementing orderly, purposeful learning experiences to meet new needs and expanding interests that grow out of an adult's changing role in his or her social setting" (p. 3).

The researcher used this theoretical framework to focus on how teachers prepared and implemented the lessons and cooperated among their colleagues and others to implement the TVET educational program and administration objectives while contributing to the design and implementation of national TVET educational programs. Specifically, this framework furnished direction for the researchers to examine how the curriculum is placed the possible progress of the TVET Program's implementation unitedly by adapting the pedagogical strategies or teaching and learning strategies.

Significance of the study

This case study is important because the TVET system is seen as a mechanism capable of supporting the intensification of production and decrease poverty in the country. The government has decided measures to establish policy direction and regulative structures for the TVET and to promote alliances with the private sectors and entrepreneurs. However, skillful human means are the principal asset of numerous state leaders. An insufficiently

instructed workforce is still among the most problematic constituents for performing industry in multiple nations in Asia and the Pacific (Giatman, 2015; Nsiah-Gyabaah, 2007).

The reconfiguration of the rural world, following the country's disengagement and centralization, has created new behaviors and new concerns among producers and industrialists involved in the value chain of the agricultural production system. Besides, at the local and worldwide levels, there is the appearance of new technologies, the modernization of equipment, and new working methods, among others. This advanced technology and new practices required on the part of support services and agricultural training schools a change of curriculum, behavior, and approach vis-à-vis applicants for training, capacity building, and professional development. To integrate these new systems changes are required at the schools in charge of training technicians.

This study is important because previous studies have shown the lacking connection in industrial and TVET system. The teachers are increasing their understanding of the country affairs regarding their teaching and learning programs and empowering them to make decisions about the extent to which they want to make these programs more competency-based in this education system (Wesselink et al. 2010). Teacher training can be improved by identifying the learning needs of the teachers themselves and examining the constraints in their activities throughout the social, political, and economic contextual circumstances that affect TVET teachers (Afeti, 2018; Bound, 2011). The periodical review of the technical structure for education, study programs, procedures, practice styles and materials, and the relationships within the TVET system and the universe of production can warrant continuous adaptation to the scientific, technological, and cultural signs of progress and the changing employment needs (Subedi, Shrestha, 2020; Ayonmike, Okwelle, & Okeke, 2015).

Definition of terms

Educational system improvement refers to actions that affect, usually reorient, and habitually rebuilding education or educational system characteristics in their totality. Also, educational system improvement is established on the hypothesis that the change for the largest or all components of the system is further possible to drive to TVET amelioration (Pavlova, 2007).

Technical and Vocational Education and training concerns to all styles and classes of the school system regarding general knowledge and competencies linking to professions in the diverse areas of economic activities and social development (UNESCO, 1989).

Pedagogy. It concentrates on growing the essence of mainstream schooling and the role that schools can play to reduce disparity and build equality in fulfillment outcomes by diminishing variabilities in practices (Florian, 2015).

Strategy is the dispositions, processes, or sequences of activities sketched to attain a special educational purpose (Davis, 2019).

Teaching strategies. In pedagogy, the teaching strategy designates clear logic to understand people learning by the type of tasks used. Different methods involve different thoughts of what the learning process is. Also, they help understand how it takes place, their distribution over time, and the structuring of groups of learners. (Davis, 2019).

Teacher-centered environments refer to classroom environments where the instructors are the authoritative figure in classrooms using their knowledge to facilitate learning, and student learning is restricted to the information provided by the teacher (Brown, 2003).

Teacher-centered approach: refers to a teaching method that focuses mainly on the transmission of knowledge from the teacher to the student and is often lecture driven with little teacher-student interaction (Grunert, 1997).

Learning. A learning strategy in a school context is a category of metacognitive or cognitive actions used in a learning situation, oriented to carry out a task or a school activity and perform operations on knowledge according to specific objectives.

Learner environments refer to classrooms where students are actively engaged with the classroom material, instructors and peers through daily dialogue, communication, and interaction (Brown, 2003).

Learner approach is a teaching method that places the student and learning at the center of the teaching experience by accounting for a learner's needs, interests, and abilities (Vavrus et al., 2011; Brown, 2003).

Chapter 2: Literature review

Program Planning Theory

Researchers focus on one example of the program planning model Cervero and Wilson's (2006) model. Knowledge of the situation and needs of the labor market, of the characteristics and requirements of the trades and professions constitutes the foundation for the implementation of planning and extension of vocational schooling. Thus, Cervero and Wilson (2006; p. iii) gives the different steps to develop a program planning:

1. The program assessment negotiation;
2. The negotiation of educational and political management program;
3. The negotiation of instructional and implementation design;
4. The negotiation of program administration and procedure;
5. The negotiation of informal and formal assessment

The program assessment negotiation. Cervero and Wilson (2006) defined need assessment *“a discrepancy between learners’ current state of knowledge, performance, or attitude and some desired state; empirical evidence must be collected to verify this discrepancy or gap, and the need assessment process must be conducted as the first step in program planning”* (p. 107). Indeed, in any planning process, researchers seek to establish and reduce the gap between the current situation and the projected situation, taking into account potential collaborations and available means (Posavac, 2015). The identification of needs makes it possible to answer the skills needs of the agricultural labor market, implying the obligation to identify the real skills and number of jobs to be filled in the agriculture economy. It facilitates establishing the training portrait to fill the gaps, make a diagnosis on the situation of the agricultural sector, and determine the development priorities (Thomas, et al., 2016).

It ensures the adoption of rigorous planning for the implementation of training and mobilization of the required financial, human, and material resources. Cervero and Wilson (2006) emphasize, “*In deciding whose interests matter, planners should bring as many different stakeholders as possible to the table to assess educational needs*” (p. 113). This decision-making is a complex cognitive process aimed at the selection of one type of action among different alternatives, and we know that in normal times and particularly in times of crisis that making a decision is a crucial act (Le Vine & White, 2017). This is why the diversification of the participants facilitates the identification of a problem in understanding the environment, verifying the relevant sources of information, collecting data, interpreting the indicators, and resulting in taking of the decision. Moreover, the determination of needs is based on precise statements of the characteristics of the trades and professions concerned.

The negotiation of educational and political management program. Planners and political decision-makers understand the need for negotiation objectives, seeking a double or even a triple legitimacy of education reforms with the support of students and their parents, support of teachers and administrative executives, and membership of the professional world. Cervero and Wilson (2006) illustrate this need to negotiation by defending that “*negotiation is the social activity in which people interact at the planning table in order to reach agreement about what to do in relation to the educational program*” (p. 94). Also, they add that “*The negotiation undertaken in these situations are consultation because people treat each other as allies and friends, trust is high, and everyone works together in a mutually supportive way*” (p. 94) to illustrate the friendly working conditions between planners and other participants of the planning process. Negotiating the program’s educational goals for improvement of learning should include the program management, instructional design, and curriculum content. It should integrate academic and vocational learning that combines applied

methodologies and teaching strategies to foster students' learning styles. Also, it combines instructions to the extent practicable in all aspects of the agriculture system appropriately drawn to the career major. The absence of negotiation, therefore, does not consistently block decisions, but it always ends up emptying them of sense. It is important that the planners intelligently negotiate the objectives of the program improvements even when this does not appear essential in the light of the balance of power.

The negotiation of instructional and implementation design. The most apparent and effective outcomes of program planning is the instructional design and implementation. Indeed, the improvement of TVET requires meticulous preparation, focused on the content, aims, and how they are organized. This planning phase allow preparation for the development of new educational tools with a curriculum that satisfies the obligations of the labor market. The complexity of the phase is well described by Sork (2000) cited by Cervero and Wilson (2006; p. 161) *“The instructional plan is the heart of the program; it’s the place where philosophy, learning theory, understanding of group dynamics, availability of technology, understanding of motivation and so on interact to influence how instruction is visualized.”* Caffarella (2002) adds that, “it involves designing the interaction between learners and instructors and/or learners and resource materials” (p. 167). Also, the effective implementation of curriculum improvement facilitates the improvement of assessment and certification courses and the identification and performance of a training system for ATVET trainers. Likewise, it helps to strengthen pedagogical inspections through the restructuring decentralization of pedagogical examinations (Rothwell & Kazanas, 2011).

Negotiating the program’s instructional design and implementation may lead to the improvement and development of ICT in ATVET establishments within particular access to the Internet and digital libraries and the provision of teaching materials and work material in

sufficient quantity (Mavrou, et al., 2017). We are convinced that better use of ICT in teaching practices could significantly improve the implementation of training standards. Therefore, the effective implementation of curriculum reform facilitates the improvement of assessment and certification courses and the identification and performance of a training system for ATVET trainers. Likewise, it helps to strengthen pedagogical inspections through the restructuring/decentralization of pedagogical examinations. Negotiating the program's instructional design and implementation may lead to the improvement and development of ICT in ATVET establishments within particular access to the Internet and digital libraries and the provision of teaching materials and work material in sufficient quantity (Daniso, 2019).

The desired quality of training from the change is the subject of particular attention during this phase to enable graduates to master the skills necessary for the practice of their profession. Indeed, Cervero and Wilson (2006) argue that *“when planners are selecting content, in addition to the educational objectives they must use other criteria, including the amount of time allocated to the program, the background, and experiences of the participants, and what the instructor knows”* (p. 166). The improvement of study programs and teaching tools must continue in the implementation of the new curriculum. The availability of pedagogy and teaching materials and, in particular, textbooks for students and teachers' guides in classrooms is another strategic axis in the negotiation of quality, which must guide the action plan for pedagogical vocational training changes (Cervero & Wilson, 2006). The authorities must also put on their agenda the pursuit of the development of fundamental standards of quality and equity, which presupposes the advancement and financing of ATVET.

The negotiation of program administration and procedure. Negotiating the administration and operation of the program sometimes needs to create a steering group. Also, the principle of r, its aims, orientations, and overall timetable are set by the authorities that

mandate the steering body. Indeed, the steering group, once set up, is supposed to embody the spirit of renewal and the concern for the public good, which is not without inducing a certain tension with the particular interests of the various actors, including those who wanted the amelioration and set up a steering group. That's why Cervero and Wilson (2006) talk about “*a variety of administrative tasks must be completed in order to bring educational programs into existence. However, naming these tasks is not sufficient to effectively organizing and operating educational program,*” (p. 187). The steering group wants to be less cumbersome, determined, or active as soon as other concerns assail them and encourage them to make compromises. It, therefore, takes a particular ingenuity to coexist and cooperate with formal authority and a steering group less concerned with managing the system than with advancing a reform because this steering group is linked to the educational enhancement initiated.

Leading progress is to navigate the deadlines by using collective intelligence without sometimes excluding the use of more substantial methods to negotiate the management and execution of the program. As Cervero and Wilson (2006) defend them well, “*...the need for collaboration, the importance of consensus, the effort to avoid conflict, and the awareness that superiors and stakeholders determine the focus and outcomes of adult education programs*” (p. 191). Planners try to understand what is at played by all means available by assembling as many clues as possible to properly negotiate the smooth running and operation of the educational improvement with the support of farmers. The planner must first take information that is both fast and reliable, which presupposes the synergy of all the actors who hold elements of appreciation and interpretation; it is up to them to assemble them cooperatively and to draw strategic decisions for the success of the educational change.

The negotiation of informal and formal assessment. The improvement of agricultural vocational training clearly shows the need to improve the quality of

teaching/learning by placing a particular emphasis on the agricultural training system of the relevant curricula, by improving the environment and learning opportunities. It also strengthens the capability of teachers and sets up a quality assurance system and continuous monitoring/evaluation of inputs, processes, performance, and the impact of learning in society. The objectives targeted by the curricula issuing from the reform compounds a framework for assessing the quality of agricultural vocational training. Thus, the planners are responsible for defining the activities, establishing the corresponding skills necessary for learning, the curricula and the teaching methods associated with them, and developing evaluation mechanisms. Indeed, the assessment of the teaching resources, the time dedicated to each curriculum, activities that constitute the teaching plan, methods of evaluation of the program's achievement, and results. All this is discussed and agreed upon between planners, teachers, participants, authorities, and students.

The negotiation of the evaluation process must be well discussed between all stakeholders in the educational plan. This process also requires consultation and participation of agricultural businesses. Thus, Cervero and Wilson (2006) argue that *“Once planners have identified the three types of objectives against which programs are evaluated, their next task is to negotiate the evidence and criteria that people use to make their judgment”* (p. 224). Furthermore, students must be assessed based on learning practical skills, and the assessment system must follow the process of developing professional qualification standards. As explained by Cafferella (1989) cited by Cervero and Wilson (2006), *“..in the evaluation process include determining the evaluation design, planning the collection of data, specifying the data analysis procedures, and establishing evaluation criteria”* (p. 225). These assessment standards must include a description of the duties, activities, and professional tasks covered.

The assessment makes it possible to establish a list of the skills required and the evaluation methods, such as formative and summative (Cervero & Wilson, 2006). Three teaching tools can be developed for the assessment standards, which are a guide to necessary materials, a teaching guide for trainers, and a list of skills to be acquired by students. It is undoubtedly interesting to evaluate the educational and pedagogical strategies implemented (Cervero & Wilson, 2006). The challenges of educational innovation are divided into four areas, governance, support and dissemination, taking into account instructional practices, and the use of the digital tools. The key point to innovation is evaluating and developing practical and innovative tools (Cervero & Wilson, 2006). Due to the rapid evolution of production methods, the evaluation system must be able to be transposed to different contexts. Thus, a new organization of curricula accompanies the original form of certification by evaluating the continuation of training courses centered on the programs leaving more room for innovations and adaptations to the contexts of the renewal of agricultural vocational training.

Elaborating Program to implementing Activities

Program planning is a process that helps to determine solutions to unsatisfactory situations by finding solutions that best address challenges, problems, and needs. It helps to identify the actions and resources needed to accomplish the expected results. Also, it is the basis of good teaching and learning performances, administrative management, and accountability. Likewise, it is often presented as a set of technical, logical, and rational processes, a series of steps linked together. These sequences are described as a logical process that each depends on the correct implementation of the preceding or simultaneous sequences. Indeed, the ongoing of these sequences include the diagnosis of referential situations of an education system, its results, and means. Also, the processes involve identification of the objectives, formulation of policies, evaluation of necessary standards, choice of indicators, the

participation of different representative groups, and administrative work. In addition, planners define the parliamentary procedure, implementation of the plan, development of action programs, projects, budgets, regional distribution, monitoring of the performance of the plan, revision, and assessment. Therefore, program planning in education may also be interpreted as cultural and human actions in which the procedures and plans adopted are the subjects not solely of discussions of methodological and theoretical choices but also of debates and political and pragmatic uses. Cervero and Wilson (2006) stated, “...*planners need an ethical commitment to democratic planning, political analysis that anticipates threats to and opportunities for enacting this commitment. And negotiation strategies tied to this commitment and analysis to improve the lives of individuals, the functioning of organizations, and the health of communities*” (p.vi). The use of these techniques reveals elements of consensus and divergences, relations of cooperation, and conflicts between social actors developing action systems that express the stakes of the struggles for influence between the social and professional groups intervening in the education administration and supervision. The use of these methods is not open-minded but relied on the circumstances, position of the diverse actors and their strategies in the decision-making process.

Managing quality is not just about maintaining the quality of situations or pedagogical implementations, but the whole educational system. In other words, quality programs must be guaranteed at the level of the pedagogical approaches, development of objectives and curriculum, use of appropriate methods and supports for the evaluation of the quality teachers and learning, and quality of management system. Each step constitutes the link in a chain, the weakness of which can compromise the effectiveness of the entire vocational training system (Cervero & Wilson, 2006). For example, what is the point of having quality teachers or investing in effective training methods if the educational objectives are not relevant to the

needs? Likewise, what would be the impact of a rigorous definition of skills if the teaching training methods are not adapted? What is the point of investing in teaching methods that focus on student-centered strategy if the evaluation system continues to favor the memorization of knowledge? Guaranteeing the quality of each stage requires attaching paramount importance to the design as much as to implementation and evaluation. The whole process have to be of quality and that it is total. The reform of agricultural vocational training can break down into four main components (Crone, Hawken & Homer, 2015). The first is the determination of skills needs with the evaluation of the objectives of training programs and the quality of teachers. The second is the conception of knowledge in a training program that emphasizes teaching and learning practices. The third is the development of training programs, transposition of these skills into a training process, and the development of skills. The fourth is the evaluation and certification of skills and assessment of the performance of the agricultural training system (**Figure 1**).

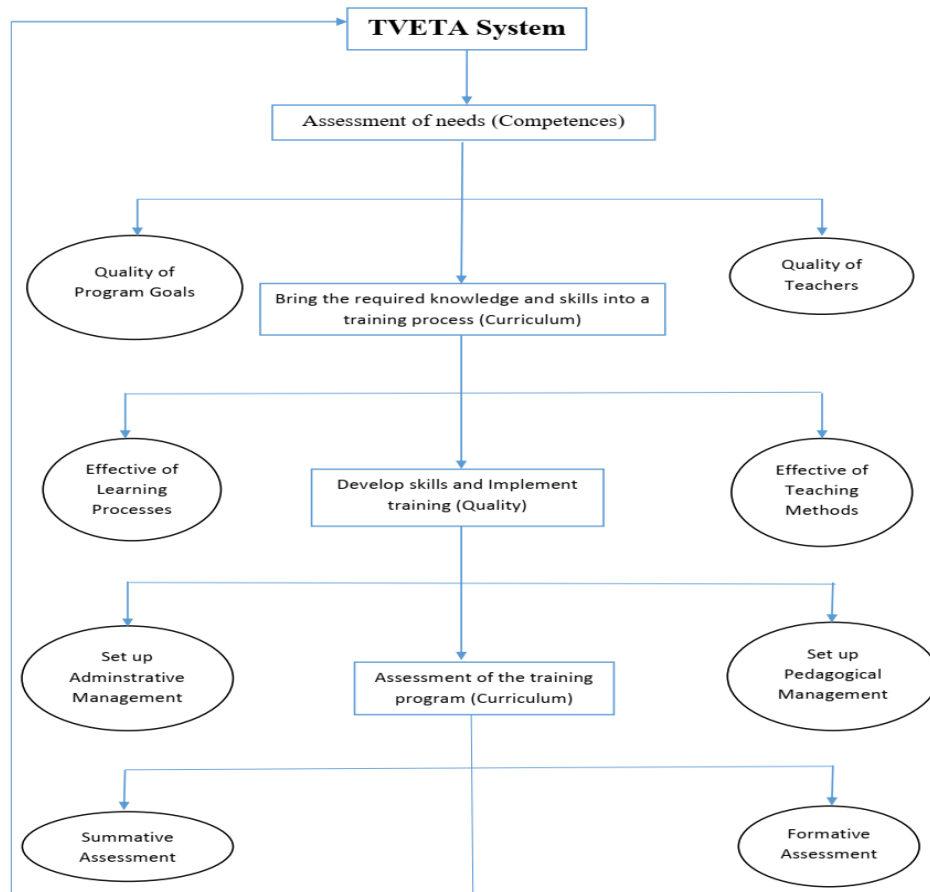


Figure 1: Program Planning Competences and Quality of Training Processes

Growth of the youth population

Rapid population growth and youth employment are the main problems in developing countries. It is also on this basis that researchers approach this study on professional educational training for youth employability through education in the professional training system in agriculture. The challenge of employment and the insertion of millions of young people is indeed a huge issue in Africa, if not the most important for the coming century. The current situations and characteristics speak for themselves: more than 300 million people enter the labor force by 2030 in sub-Saharan Africa alone, or 20 million workers entering the labor market every year (Evans et al., 2019). While the growth of the youth population is slowing in all other parts of the world, it will continue to grow in Africa until 2050 and

beyond. Moreover, although youth unemployment is an effect known to politicians, economists, and people in business, its magnitude reaches unprecedented proportions, which will increase in the coming years.

The increasing problem of youth lay-off jobs is one of the principal matters for social and economic improvement in most sub-Saharan Africa countries. Therefore, the local communities cannot profit from job possibilities that allow sufficient revenue without job-related skills that meet the job market demands. In these countries, the principal factor of economic growth approaches is to sustain and reinforce youth acquiring trained competencies within the TVET programs. The strategies also help support entrepreneurship. In Senegal, the labor market dynamics remain worrying, given its low capacity to absorb young people, the preponderance of the informal sector, the extent of underemployment, and fluctuations in current employment. According to Filmer, Fox (2014 p. 226), “Despite the recent creation of private wage jobs, the share of wage employment remains low throughout Africa, partly because the public sector shed so many jobs.” The duality of the economy, with the coexistence of a formal and an informal sector, slows down the dynamics of the labor market in terms of the absorption capacity of the different categories of the active population. This is why vocational training and its effectiveness in providing qualified technicians for the job market has been attracting the attention of policymakers for the past few years. It requires continuous adaptation to fulfill the requirements of the workforce demands. Hence, the need to readjust vocational and technical training systems to the needs of the job market, public policies, and the socio-economic context.

Nowadays, the main questions to support ATVET remain central for the authorities despite the interests and investments in the value chains for economic development (Wrana & Nguyen, 2019; Staritz, Plank & Morris, 2016). They have observed a resurgence of the lack of

consensus to find a way on how to best support and improve ATVET skills and occupations in economic challenges. Indeed, ATVET still used an outdated approach in teaching and learning, supporting economic change and industries, and rural development. Therefore it is essential to know how the national government can and its partners' change the framework within which to address the changing needs of the different value-chains within the agriculture system and invest in professional and technical abilities for horticulture and livestock? In general, in the circumstances of TVET systems, several governmental partners, philanthropic agencies, and professionals in education have changed the paradigm of discussion about vocational versus formal training in inclusive goals of workforce developments.

In the context of agriculture, with the changing needs of the different value-chains and workforce developments and demands, there is still a deficiency of agreement on the ways to develop new types of occupations to meet the needs of these value-chains and how best to train and prepare students and professionals for those roles. Indeed, Jones (2013) suggested a two-tiered farming system, with individual producers instantly involved in agriculture productions. The second level of companies and industries provides them the supports and essential co-operations to strengthen the value chains. The research has explored remarkable of the vital problems currently standing ATVET system in general but has focused on the needed shifting roles in current economic developments for agricultural development and value-chains. The educational approaches at which ATVET advancement curricula function, the variety of competencies and knowledge covered in education curricula, and the description of farming jobs in the value-chains are central for this study.

The situation in Senegal does not differ from the rest of the continent. As in most countries in demographic transition, the Senegalese population is mostly young, with a

population of fewer than 15 years estimated at 43% of the total population and an annual growth rate of 3% (Ministry of Economy and Finance, 2014; Republic of Senegal, 2014a).

This growing young job market is dominated by unskilled workers. The latest studies estimate that 46% of young unemployed people have no education, and only 26% have a higher education than primary school (Republic of Senegal, 2015).

To respond to this situation, the Senegalese government, through different programs such as improving quality, equity, and transparency, building new classrooms, and creating updated curricula, aiming to improve the country's education and training sectors by 2025 (Republic of Senegal, 2014a). In these programs, education and technical and vocational training play a pivotal role in overcoming this problematic situation that we face since the 80s. The analysis of the main issues that the different actors in public and private fields and civil society in TVET must overcome in order to achieve a professional training system adapted to the professional insertion of young people in Senegal has become a primordial necessity to solve this problem. However, the level of study varies between different sectors of education in the country, although rates have risen significantly between years and today. The share of students in this education sector is lower compared to other types of academic training. The rates of students enrolled in the TVET stream are generally lower in the country compared to other students in the traditional education system.

Senegal is developing quickly; it creates workforces and professions that demand reliable training and technical abilities. Also, the significant transformations of the productive system did not accompany changes in teaching methods and the users of knowledge and skills. The TVET is necessary factors in the improvement of economics and socials because it empowers communities and organizations to open their potential, extend their limits, and accommodate the innovations in the dynamic society (Oviawe, Uwameiye, & Uddin, 2017;

Reeve, 2016; Marope, Chakroun, & Holmes, 2015). Therefore, it is essential to have TVET programs that are more accessible and useful to people so they can learn sustainable ways to practice agriculture. Although the increase in TVET reflects the growing interest in policies for this sector, students' actual rates rarely reach national targets. The TVET system shows that the vast differences in distribution across the country the differences exist within regions of the country. Small towns and rural areas are often under-endowed compared to capitals and large cities. This is due to the nature of the technical and vocational system, which needs to be located close to industries and services for reasons of efficiency and relevance (Kruss, & Petersen, 2018).

TVET in the educational system

TVET is an aspect of education that is introduced into the Senegalese education system in the sixties. It involves those characters of the education method that include a supplement to general curricula, technologies, practical experiences, stances, comprehension, and knowledge relating to various socio-economic areas. TVET is an aspect of education that is introduced into the Senegalese education system in the sixties. After independence, Senegal has created rich and varied agricultural training systems designed for the development of resources and managed agriculture. Agriculture oriented mainly by a state vision leaves little room for the people's concerns and vision (Ahmad, 2016).

Today, Senegal is in a historic phase characterized by a renewed interest in agriculture. To increase agricultural production, improve the income of producers, industrialists, and subscribe to the realization of the aims set by the various strategic policies and international agreements signed by the country. To this end, the country of Senegal has begun to support the sector by re-injecting significant funding. On the other hand, the state of human resources at the level of the various segments of the agricultural sector risks being a

brake for these very innovative measures to improve the agricultural production system (Lamb, 2011). In addition to the deficiency in numbers, the staff and teachers show weaknesses in terms of professional qualifications to tackle the challenges (Giatman, 2015). Indeed, with the State's disengagement, the resources allocated to agricultural training schools are considerably reduced. The automaticity of recruitment to the public service is arrested, forcing them to reduce their staff numbers, students, and their ambitions. Thus, the teaching staff suffers from several issues such as the deficit in number, the aging and the lack of qualification of the trainers, outdated programs of formations, and the school of agricultural formations lack of materials, equipment, and insufficient budgets.

Reforms expected to diversify training opportunities and adapt approaches have not always been made. During the structural adjustment period, the agricultural training sector has been left behind, training structures agonized, and graduate students have no longer been recruited. Due to a lack of human, financial and class material inputs, schools still struggle to fulfill the missions assigned to them, especially to meet rural producers and industrialists' vocational training needs in all fields related to the agricultural value chain. Thus, matching the profiles of graduates of agricultural training schools with the missions that await them in the field. Therefore, for the implementation of the agricultural and rural sector recovery programs, there are several personal resources responsible for agricultural and rural training. It is necessary to note the shortage of teachers, their engagement, especially at the level of public structures, qualifications of the staff in the office, and the inappropriate reforms of the agricultural training system.

As stated by UNESCO: “technical and vocational education should be designed to operate within a framework of open-ended and flexible structures in the context of lifelong education provide a the basis for education and training that may be essential for occupational mobility, improvement of professional qualifications and updating of knowledge, skills and understanding” (1989; p. 5).

Some specific challenges are policymakers and national authorities' attitude toward TVET programs and the problem of not having enough human resources and money to support the programs (Afeti, 2018; Chukwunwendu, 2015). New skills need to be taught through TVET, to advance new challenges such as globalization and sustainability of agriculture production, rapid technologies, and the emergence of new societal knowledge (Afeti, 2018; Nhavoto, 2013). Therefore, the training of the teachers must be updated by authorities to keep up with these new challenges in concordance with the diverse sectors of the marketplace. Advancements in pedagogical inquiry and modernization have brought into consideration a view to the employment of the most efficient pedagogical approaches.

Types of TVET in Senegal

In the TVET system, there is a formal system of agricultural and rural training ranging from primary level to university in Senegal. The types of formal TVET are classified into two broad groups, which consist of public and private training institutions offering certificate or diploma programs. Agricultural and rural training (FAR) is provided by various institutions awarding diplomas (from CAP / BEP to doctoral level). With a few exceptions, the centers offer programs leading to a CAP or BEP diploma only. As its name suggests, CFP targets young women. With few exceptions, the vast majority of CFP programs are limited to agriculture, hairdressing, tailoring, clothing, catering, crafts, health, and base development (MEFPAI, 2020; MESRI, 2020; Ndiaye, 2019).

Some structures are entirely dedicated to agricultural and rural training at the higher level, such as ISFAR, ENSA, and EISMV in Dakar, which trains from construction engineers to veterinarians. New agricultural, agro-industrial, and rural training structures are opened in certain universities with UFRs and departments specializing in the agricultural training. The UGB of Saint Louis has UFR S2ATA, with a license in four fields of agronomy, from UCAD

with the ESEA and the Higher Institute of Agriculture and Entrepreneurship (ISAE), from the University of Assane Seck de Ziguinchor with the Agroforestry Department of the Life and Earth Sciences UFR. We recently noted the creation of the Higher Institute of Professional Education (ISEP) in several regions of Senegal (MEFPAI, 2020, Ndiaye, 2019;).

Technical high schools (LT) offer a full range of degrees from CAP to BTS, but the main focus is the BTS degree which other post-secondary institutions also award. Technical high schools prepare students for the technical baccalaureate, which is not a professional diploma. It does not prepare students in a specific field but prepares students for continuing education for IUT, BTS, or schools of engineers. Unlike TVET centers, technical high schools do not recruit directly. Instead, ministry officials select and assign students based on previous academic achievement and the number of places available. The IUT and ISEPs offer the DUT and the DTS, respectively. IUTs are autonomous entities within the university system (MEFPAI, 2020; Ndiaye, 2019).

Private providers. Students in private management centers can sit for state certification exams or opt for a diploma issued by the training organization (school diploma). Typically, students who choose the latter option have either failed national certification exams or are attending institutions known to offer high-quality education, so a State Diploma does not confer any additional advantage over a school diploma.

TVET and Job Market in in Francophone countries of West Africa

The TVET educational system's definition is accepted as focuses on education for knowledge and occupational skills mentioned in the introduction (focuses on education for occupational skills, (Takyi-Amoako, 2018, Olenik and Fawcett 2013; UNESCO 2004; UNESCO 1989). Therefore, the definition is used as a common ground to describe efforts that strengthen TVET and to improve the current teaching approaches and future

opportunities in developing and improving the value chains. Likewise, to this intimate comprehension of the TVET as a general and competencies-based teaching and learning system associated with the prospective contracting of the learners, Takyi-Amoako (2018) expands the field of potential learning contents of TVET, incorporating balanced training for resilient youth progress, enhanced community and moral participation, and poverty relief. The contents emphasize good work ethics, practical competencies, interpretive reasoning, and combine to professional contents. Throughout, the assumption is that TVET turned approaching job market progress provides people with experiences that strengthen their employability opportunities, and therefore increase their incomes.

In recent years, Francophone countries of West Africa have demonstrated increased efforts in TVET systems and structures. Although the country does not respond to a similar change pattern in other Francophone countries, it seems that this interest in TVET is due to this employment situation (Brock, 2015; Republic of Senegal, 2015; Filmer, 2014). Besides, the technical development of the labor market in this country encourages the search for qualified personnel responding to the industries and the private sector's development (Hassan, & Maizam, 2017; Kirior, 2017; Ismail, & Mohammed, 2015; Constant et al., 2014). Traditional education is no longer the prerogative of employment, and TVET systems are an alternative skill development pathway. Hence, the TVET sector is an excellent way to certify professionals in the informal economy, very present in the country's economic system, with diplomas recognized by the State (Ogwo, 2018).

Also, the classic educational system does not seem to stimulate the entrepreneurial spirit early enough. The unemployment rate of upper-level graduates is particularly high. This phenomenon can be explained, among other things, by the irrelevance of educational curricula concerning the needs of the job markets. When students were now hired by the public

administration when they graduated, they are long gone (Gyamera, & Burke, 2018). The TVET still faces several obstacles, particularly a training offer that is not adapted to the demands of the workforces in agriculture for the value chain, low levels of training, poor quality of pedagogical supervision, inappropriate administration management that redundancies and overlaps certain services, weak decentralization local authority, budgetary arbitrage to the detriment of the TVET sector, a negative perception of the image of the education system, a resistance of certain actors such as in private fields, and civil society to the changes and a shortage of human resources with specific profiles (Takyi-Amoako, 2018; Republic of Senegal, 2015; Jones, 2013; Lilly, & Efajemue, 2011).

Moreover, teaching and learning and professional advancement are fundamental to agriculture and rural profession in Africa (Adesugba, & Mavrotas, 2016; Lowitt et al., 2015). TVET is acknowledged as an essential subsector for the achievement of industrial growth; however, the education contents at some levels are obsoleted, and the teaching and learning characters and has continued to weaken (Mack, White, 2019; Maclean, Jagannathan, & Panth, 2018; Christiaensen, & Premand, 2017). Although great teachers influence the effectiveness of TVET (UNEVOC, 2012), one big problem of TVET is the lack of modernization of teachers' training programs to bring them to straighten with the fundamentals of the workforce standards (Liu, Liu, & Hariyanto, 2020; Marope, Chakroun, & Holmes, 2015; Mukhtar, & Ahmad, 2015; Paryono, 2015). In addition, the problems of the modernization of teachers' training programs lie on the development of research competencies and strength of future teachers' practical training, which are the aim of the tasks of the professionalization of pedagogical programs to meet the professional standard of the teacher.

Also, the different professions of TVET are interested, and governments can use these profiles to define the priorities and the choices of courses of formation to be developed or on

the contrary to suppress or reform. They allow a reflection on the too theoretical or inappropriate nature of particular training programs, on their validity, which systematically leads their former students unemployed or which does not allow them to occupy posts corresponding to their sector of study (Takyi-Amoako, 2018; Republic of Senegal, 2015; Okwelle & Ayonmike, 2014). For human resource planners, these reflections can provide them with sensitive information on the relationships between levels of training and employment on specific categories of the labor force.

Likewise, the politicians are interested in this because they seek to optimize, from political economics and societal points of judgments and opinions, the investments, often considerable, made in favor of education (Ngcwangu, 2015; Oketch, 2014; Republic of Senegal, 2014b). They are interested when it comes to setting up an education system that can best meet the country's development needs. TVET is a sensitive sector, both economically and socially. On the economic level, because this education component aims to instruct skillful workers for specific positions, which in turn must improve productivities and competitiveness of companies, it is also a branch of education that is not so expensive and at a lower cost than other types of training such as private and traditional education sectors. On the social level, because their purpose is to prepare young people for employment and thus insert themselves into society, where unemployment would be a direct challenge to their training.

Moreover, TVET has a leading role in the job market of young people. However, for this insertion to be of quality, specific criteria must be respected (Rogan, 2019; Alman et al., 2013). Indeed, sufficient financial means are needed, usually larger than in other education categories because TVET requires much financial support to meet its mission and training objectives. This important economic demand is due to the often lower teacher ratio and the high cost of teaching materials and required workshops or laboratories.

Karemu and George (2014) that “Finance public technical and vocational training institutions to improve their performance, introduce the newest methods and technology for teaching and learning for both students and teachers, introduce performance standards and regularly evaluate the accomplishment of these standards, and also introduce new effective methods for monitoring and evaluation of performance, facelift the facilities in these institutions to boost their image, motivate employees by paying them competitively and re-training them to equip them with modern skills, and avail all the necessary materials for training both for students and teachers.”

This circumstance is a frequent constraint, especially in public institutions (Takyi-Amoako, 2018), however, funding sources are generally multiple and come from public budget allocations, business tax deductions, households, training center resources, and sometimes development partnerships with other countries or institutes. The involvement of industries in financing is essential and is generally worth reflecting on their interest in this type of education.

Furthermore, continuing professional training is also advised according to the needs and reinforcement of their skills. It also allows a pedagogical follow-up of these trainers because teachers also have an important role in the quality of training and, therefore, of youth insertion. Also, their profile must be analyzed, giving priority to those from the corporate world. Initial and homogenized training on the territory must then be provided (Musyimi et al., 2018). To avoid a turnover that is sometimes important for the country, a recognition of the status of trainers by validating their acquired experience retains them into the educational system, but also sufficient remuneration. It is also necessary to assess the economic needs of the territory so that the training is well connected with local and national economic issues to promote a good match between TVET and integration into employment (Republic of Senegal, 2015). A necessary prerequisite is, therefore, to know the dynamics and employment opportunities through, for example, a diagnosis. When training focuses and adapts to these territorial realities, industries are much more attentive, and collaboration is also facilitated. A difficulty often encountered is that some regions may be under-equipped, and the supply is

usually lower in rural areas. This is due to the very nature of technical and vocational education, which needs to be located close to industries and services for reasons of efficiency and relevance.

Partnership between TVET, industry, and financial society

TVET system is recognized as an educational system expected to provide and produce a qualified workforce who are expected to fight and surpass in rapid growth conditions and improves the country's economics. Therefore, a real partnership should create between TVET, industry, and financial society (Raihan, 2014; Okoye, & Chijioke, 2013). This partnership relies on industries' involvement in creating, implementing or modifying training schemes for good academic programs that can contribute to the learning process and healthy economic development to provide opportunities for positive growth. Indeed, the learning process is positively bestowed if learners can practice what they were taught in character, implementation, and production in the field. Hence, the new paradigm for an excellent educational system instills these learning qualities to youths (Oviawe, et al., 2017; Ayonmike, et al., 2015). In sense, Usman & Tasmin (2015) viewed TVET as an indispensable part of national development strategies such as the West African countries because human resources impact economic developments and work productivity. From these standpoints, TVET worldwide aims to train and mobilize a competent and skilled workforce for technological progress, industrialization, and national development, because of its emphasis on work productivity.

Likewise, this training alternatively course is highly studied and sought after in the field of TVET. Indeed, it creates a close relationship between the worlds of education and works from which flows a very favorable context for the three parties: students, industries, training centers (Gamede, & Uleanya, 2019). For example, industries can improve their

recruitment procedures and engage young people whose potential they know. Professionals can advise and give salary to young people and expand their network of relationships. The training centers can adapt to better demand and minimize their investment costs in teaching materials.

The future teachers must have the required knowledge, experiences, and abilities to improve the TVET system. In addition, they have to build potential association and federation of educational institutes of general and university education levels such as high school and private partnerships, so that they can have the opportunity to carry out professional development actions through a short-research set in professional practice and reflection of their fundamental skills (Marope, Chakroun, & Holmes, 2015; Margolis 2014). Teacher learning takes place in official sessions and through everyday activities in the workplace (Bound, 2011). Moreover, teacher training can be done through the identification of the education necessities and demands of the instructors themselves, an examination of the constraints in the activities of the educators, along with the socio-economics, governmental, and industrial contextual circumstances that impact TVET teachers (Bound 2011; Wesselink et al. 2010). Given these, the problems of modernizing the modern vocational teachers' training system have become very relevant.

Improving the TVETs' students' enrollment

Another aspect of improving youth insertion in the job market through TVET is via the overcrowding of TVET. In addition to financial issues or policy objectives, access to TVET is vital. This access is enhanced by increasing the visibility of existing training for the public. Information and promotion around these must be supported and must overcome technical and vocational training's often negative assumptions. Of course, the training centers must, as said before, be supported politically and financially to increase their capacity in terms of space and

equipment (Republic of Senegal, 2015). Although this reflection is concerned with the integration of young people leaving TVET, this insertion is not installed once and for all at the time of graduation, but built during the training path and all along the professional trajectory. This lifelong learning called continuing education is more taken into account in recent years, and it contributes to a facilitated insertion during a career or conversion. To meet the challenges of employability through TVET, training in itself, as powerful as it is, is not enough. The young person must be able to be accompanied on the way to employment.

The reception and orientation services are generally provided to do this. These initiatives, such as integration platforms, have career guidance and information function. Their goal is to welcome young people and inform him about the professions, accompany him in elaboration, and the definition of his professional project. According to each person's needs, desires, and skills (Republic of Senegal, 2014b). Accompanying persons are professionals who consider the situation of the young person (means of mobility, family situation, health, etc.). Job search technology workshops are organized, as well as maintenance simulations and company visits. The support does not stop at the end of the training and may even continue after the first job stall.

The integration platform also has a function of articulation between the different local actors (training center, employment agencies, and private sector) to multiply the opportunities and develop a professional network to which the young can have access to find this job. Unfortunately, training centers do not always have access to these services. The employment aids support for the creation of activity and promote self-employment. It is indeed common for students leaving TVET to create their job, and it is also one of the characteristics that attract support for education policies in the country (Musyimi, et al., 2018). To allow young people who wish to start as entrepreneurs to have a starting fund, microfinance institutions are

generally available. However, they are asking for fundamental guarantees for these new job seekers to start their businesses.

Opportunities of TVET system

The TVET sector in Senegal can, however, count on several opportunities (Ismail, 2018). First, a rarity compared to the rest of the continent, the country has never experienced a military coup since independence, ensuring a long-term, solid political foundation. Secondly, the country has a strategic geographical location as a maritime crossroads, a good endowment of natural resources, and a potential base of regional service platforms such as education, finance, and health. Likewise, a transition demographic change and a clear political can rely on the TVET to promote youth employment by supporting technical and financial partners and the high demand for skilled labor in crafts and central public and private investment programs (Deguenonvo, 2019). The country's government opts for TVET partnership management with the local authorities and the private sector involved. To do so, it includes:

- Realize the map of the Vocational training system according to the requirements of the economies and the potential of the different industrial development poles of the country;
- Create specialized technical and vocational training center in each of the six development poles with a correction of the disparities between rural and urban areas;
- Develop a strong partnership with public and private companies and professional organizations; within this framework, a list of training partner companies are established and the necessary legal, financial and educational provisions developed;

- Strengthen the qualification of trainers and set up a quality assurance system of technical and vocational training involving the chambers of trade and professional organizations, companies;
- Establish a bold equipment policy, monitoring, and maintenance in the vocational training;
- Increase the involvement of private sectors' actors in the TVET system in supervisions and management by setting up boards of directors and establishment boards;
- Increase the number of women in the scientific and technical fields.

To carry out this reflection, we looked at the challenges that TVET and the different actors involved in TVET must overcome in order to achieve a vocational training system adapted to the professional integration of young people in Senegal. To do this, a relationship between the private and public sectors has a significant result on the characteristic of work integration. Secondly, the relationship between public and private fields, and civil society must move towards close collaboration if we want to sustain their actions and save time and resources. Lastly, a model of close links connecting the training and work sectors, with consolidated and sustained integration schemes, should serve as a reference for those involved in the field of professional integration.

Pedagogical approaches in the TVET system

The educational literature is full of teaching methods, and the science of teaching continues to evolve to the point that educational specialists develop new academic concepts based on recent research. Teaching and learning with meaningful vocational pedagogy ought to reveal as shared spaces and learning interactions for both students and educators (Okada et

al., 2019). There is, therefore, no single and unanimous definition of the pedagogy method. Thus, there are several definitions of pedagogical approaches in educational sciences. Lucas et al. (2012) gave an operational definition of vocational pedagogy that captured art and proficiency centrality in designing centered learning environments for promoting competencies. The illustration apprehends instructors' central motivation, capability, and usefulness practices in producing significant training experiences (Lozano, et al., 2017; Lucas et al., 2012).

In general, we hold that a teaching method is used to develop learning and fulfill a specific educational objective. Finally, it should be noted that any teaching method is subject to change and must be the subject of continuous reflection after each training (Lucas et al., 2012). Indeed, the trainer must ensure that his approach is adapted to his learners and that it aims to facilitate learning (Erlam, Smythe & Wright-St Clair, 2018). To adequately satisfy the necessities of all learners, the teacher should facilitate learning using a variety of teaching strategies and methods. A partial list of strategies and methods applicable to vocational education may facilitate the teacher's choice (Okada, et al., 2019). Many of the following teaching methods are referred to and demonstrated throughout the curriculum in TVETs, in specific objectives, examples offered, instructional suggestions, and model units. It is postulated that a teaching method's effectiveness is linked to its adequacy with its linguistic, cultural, and educational context. Thereby, researchers want to focus on the competency approach, although several methods or approaches exist.

Competency approach

For several years, college and vocational programs have been designed according to the competency-based approach. This approach promotes the curriculum approach, ensures the cohesion of educational activities, and defines training targets centered on developing

learners' skills (Grosh, 2017; Ismail, et al., 2017). This teaching aims to enable learners to become competent with knowledge, that is to say, to use the relevant experience to adopt know-how behaviors that promote their well-being with interpersonal skills training (Lucas et al., 2012). The importance is on strengthening the skills of the learners. The expression competency-based approach is used here in the broad sense to refer to the pedagogy considered most appropriate in terms of teaching. Approached from a technical perspective, a skill is a way of writing one or more courses' objectives, taking into account what the learner accomplishes if he succeeds in these courses (Ismail, et al., 2017). Considered from an educational perspective, it appears that skill is the ability to perform tasks or solve problems by following a structured approach, mobilizing appropriate knowledge and skills. The competency approach consists of a range of pedagogies based on the practice and problem-solving in concrete contextualized situations. That is, to say, in close connection with learners' everyday lives and the community lives.

In traditional pedagogical approaches, learning is mostly centered on content that is seen as a priority for the learner's training. Skills develop without systematically investing in their development. Indeed, knowledge, attitudes, and skills are critical elements in deciding how an individual chooses to adapt or change (Obinnim, 2018). If we want technical education to be effective, these three aspects must be included in the curriculum. This is why the skills-based approach is criticized because of the neglect of content in favor of technical skills. However, it should be noted that the competency-based approach does not reduce learning to the sole development of skills since it supposes the mobilization of knowledge in the context of problem solving. The effective integration of this approach into professional training programs recalls a crucial thinking, not only of the way of teaching and the way of evaluation but also of the training and support to be given to teachers (Ismail, et al., 2017;

Ridzwan, et al., 2017). Teachers must indeed adapt to curriculum reforms, which requires efforts on their part. But to a large extent, the success of these reforms - that is, the impact of these reforms on learning outcomes - is in a teachers' hands.

In modern approaches to education, centered learners' learning, the pedagogical contract is transformed, roles change. Thus, modern pedagogical approaches are mostly the result of the pedagogical experiments carried out by teachers in various contexts to define pedagogy. In this context of a change in the pedagogical paradigm, very few professors today consider students passive receptacles to be satisfied with knowledge (Obinnim, 2018; Ridzwan et al., 2017). Thus, the development in students of broad skills or abilities, such as critical thinking and creativity, depends on integrating three broad areas of learning: knowledge, skills, and values. In this approach centered on the students' learning, the teacher attaches the most significant importance to the learners' participation in the class's work. The latter's capacity to follow the course's rhythm becomes one of the elements taken into consideration for evaluation. Assessment of learning becomes more precise and objective than traditional evaluation because it is mainly based on test results. However, the tradition of "global" assessment within the class council has not yet been abandoned. There are, of course, various approaches, methods, theories that have been advocated since, in this perspective of active learning: mastery pedagogy, project approach, curriculum by objectives, constructivism, etc. (Van Halsma et al., 2017). The skills-based approach integrates the knowledge gained from field experiments and offers a coherent and structured vision of learning; therefore, it redefines students' and teachers' respective roles.

Links between curriculum and pedagogy

Curriculum reforms are generally expected to improve learning outcomes on the one hand and, on another level, that these changes in the official curriculum translate into changes

in classroom teaching practices in schools. How curricula are translated into practice, however, is not so clearly defined. Classroom dynamics have their characteristics and structures and are shaped, among other things, by interactions between teachers and learners (Kraak & Paterson, 2016; Mukhtar & Ahmad, 2015). Another important consideration is that vocational training education requires an approach that promotes active learner participation, critical thinking, and experiential learning. These teaching and learning methods are challenging to implement with traditional pedagogical approaches of frontal teaching and in the face of large numbers still in force in many schools (Boitshwarelo, & Vemuri, 2017; Ismail, & Mohammed, 2015). The practical introduction of new skills-based pedagogical approaches also depends on:

- How the curriculum change was designed: were stakeholders able to participate in shaping these changes?
- The chosen curriculum approach: is it in line with a skills-based pedagogical approach? Was it well presented to teachers?
- Developed teaching material and assessment methods: are they suited to this skills-based approach?

These pedagogical strategies are based on theoretical paradigms of learning. They complement each other, and even in some aspects, overlap one another. Likewise, they provide an overview of the factors justifying the application of specific pedagogical approaches to youth's education skills for employability (Libânea, 2017). These theories present different perspectives on why skills development is essential. Based on these theoretical models, recommendations are made to the most appropriate pedagogies to facilitate young people's learning skills.

Chapter 3:

Purpose and research questions

The purpose of the research is to examine what requires a change to promote the agriculture TVET programs in Senegal by focusing on pedagogical aspects and teaching strategies to address the new growing competency demands of the different value-chains within the agriculture system in Senegal. Indeed, ATVET should be improved into a better plan, especially when the country needs to introduce new educational programs and competencies for teachers TVET and staff to improve the training opportunities offered to local producers, students, and industrials the competency demands of the different value-chains within the agriculture system. These four significant questions led this case study:

1. What teaching activities do instructors utilize in the Technical and Vocational Education Program in Senegal?
2. How do teachers describe the learning experiences of the graduates of TVET programs in agriculture?
3. How do teachers see the educational experiences influencing the employment and career opportunities of the graduates of TVET programs in agriculture?
4. How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?

Using a Case Study as a qualitative design

A case study is a method for conducting an investigation that includes an empirical inquiry of a current specific phenomenon inside its real-life circumstances using various data origins (Yin, 2017; Yin, 2009). Case studies are probably the most generic of qualitative designs (Mertens & Wilson, 2012; p. 331) to place substantial emphasis on inductive investigation, discovery, and holistic analysis by focusing on complex contexts. With a rich

review of the literature regarding the TVET education system, using a case study may be the most appropriate way to carry out precisely the changing needs of the different education systems and value-chains within agriculture, and explore emerging themes. The principal advantage of using a case study design is to gather a rich understanding through in-depth interviews. The study was implemented in two regions of Senegal to know the situations in the TVET system that need to be changed to meet the workforce demand. Yin (2009; p. 15) explained that a case study could be generalized based on theoretical schemes and not population or universes. For this reason, the research study, similar to the test, does not reproduce (*a sample*), and in performing a case study, the purpose was enumerating frequencies (*statistical generalization*). Therefore, this specific case proposes to be generalized for all TVET Institutes, despite the researcher recognizes that it is challenging and limiting to generalize research using case study methods (Mays & Pope, 2020; Creswell, 2009; Creswell, 2007)

As a case study, evidence was collected throughout interviews (Yin, 2017; Patton, 2015; Yin, 2009). The proposed study helped obtain a rich understanding of the need for improvement in the TVET system through interviews. It is also an evidence study that was investigated deeply and analyze interactions between the factors that explain the present situation or influence change or growth. Although the study primarily used qualitative data reflecting personal information, financial situation, and equipment and infrastructure of the institution where the participants' were interviewed working. Moreover, it should help to construct a general purview of the socio-economic situation facing TVET institutes.

Site Selection

Located between 14 ° 30 and 15 ° north latitude and 15 ° 40 and 16 ° 40 west longitude, the region of Diourbel covers an area of 4769 km² with an estimated population of 1,420,082 inhabitants in 2017 (RGPHAE, 2013; MEF, 2011). The substantial effort remains to be done, especially at the level of ATVET. The increase is due to the opening of the new TVET "Moubarack Learning Center." The region has 2 ATVET in which youth and farmers occupy an essential place in the training system and curricula. In addition to the training, the ATVET leads to shallow income-generating activities: exhibitions, sale of agricultural products, various services such as capacity building, and transformation of agricultural products (RGPHAE, 2013; MEF, 2011). The resources generated do not allow them to purchase the missing equipment, purchase work materials, and increase resources to support the educational system.

This region covers an area of 6,601 km² with an approximated inhabitants of 1,788,684 inhabitants (RGPHAE, 2013). The Inspectorate of the Academy of Thies has well provided in TVET structures. It comes in the second position after Dakar with, 14 centers of TVET in Senegal, most of which are in the private sector (RGPHAE, 2013). TVET covers many areas of need for the regional development of Thies, including agriculture. Non-formal education comprises both functional literacy programs and basic community schools. In the Thies region, the TVET suffers from the limit of accommodation capacity, the obsolescence of facilities and equipment, the inadequacy of programs, the lack of involvement of professionals in training and program development.

These localities have chosen because they wish to improve their training and literacy programs for youth and adults to adapt to the needs of improved and increased educational and professional development programs. The two regions were chosen because partnerships

between the ATVET institutions and farmers' organizations are well developed. Also, the researcher has worked with them in the educational system to the process of training and learning farmers to improve the agricultural production system.

Participant selection

The researcher worked with the ATVET staff and teacher, in these two regions for the case study. After acquiring consent from the Institutional Review Board at Virginia Tech, the lead of the study asked all individuals to complete consent forms. These included consent for interviews (Yin, 2017). Purposeful sampling strategies were used to select participants for this research because they can provide information-rich cases from their experience and knowledge for the most practical application of inadequate supplies (Patton, 2014). In addition to knowledge and experience, they were all available and willing to participate in the research process, including the capacity to deliver experiences and views in an understandable, meaningful, and thoughtful behavior.

The participants in the study were the teachers and administrators in the current ATVET programs. Participants' experiences represented different ranges of experience from five to more than ten years to ensure gathering information-rich. The lead researcher interviewed two school directors and ten ATVET teachers. Also, they selected the participants because of their experiences and their involvement in the ATVET educational system (Marope, Chakroun, & Holmes, 2015; Patton, 2014; Margolis, 2014; Bound, 2011). The sample for this qualitative inquiry, as their practices and knowledge are related to the investigation questions (Yin, 2017; Stake, 1995; Schwandt, 2001; Patton, 2002). This professional situation aligns with what Patton (2014; p. 264) explained, "Information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry" The expected data "rich information" is the primary motive why the

group is taken (Patton, 2002, p. 231). Moreover, the researcher gathered data from their insights and statements to answer the research questions.

Table 1: Participants' Characteristics

Name used in the document	gender	Years in the profession (Years)
Yoro	Men	21
Boy Peul	Men	19
Niokhor	Men	10
Diarra	Woman	12
Ngouye	Woman	15
Max	Men	10
Ouse	Men	13
Nguabou	Woman	18
Mary	Woman	17
Almamy	Men	10
Darou	Woman	9

Data Collection

Guided by the mutual interests of the TVET school directors, faculties, and members of the research team, case study inquiry was used to investigate strategies used to discuss the dynamic demands of the different pedagogical issues and teaching strategies, and agricultural value-chains within the Senegalese' TVET system (Afeti, 2018; Ayonmike, C. S., Okwelle, P. C., & Okeke, B. C. (2015). The researchers used a descriptive case study to examine and collect data because of the researchers' interests in this research method and its applicability in education, such as the TVET system and its performances (Yin, 2017; Graue, 2015; Yin,

2009). For this qualitative research, the data collection involved individual interviews with all participants.

During the field research, the researchers attended meetings with the participants in the ATVET system to conduct the face-to-face interviews. After obtaining consent from the Institutional Review Board, all program participants were invited via telephone and/or email due to time. A general consent form was provided at the first informational meeting during the recruitment of the study with the participants. The consent form covered interviews. The researcher discussed the study, and each interviewee got a personal exemplar of the consent form. Also, the researchers used email to explain the purpose of the study to all participants. They were notified that this study was optional and that their responses are confidential during and after the implementation phase. The participants were provided time to examine the consent form and were free to ask the researcher any questions he/she may have. Participants were further notified that they might withdraw at any time. Withdrawal from the study did not result in any penalty, and all data collected from that participant was discarded and destroyed.

The researcher created a set of *a priori* propositions to guide the investigation. The *a priori* scheme stated in Table 2 was used by the researchers to design and developed the interview guide (Yin, 2017; Patton, 2014; Cafferella & Daffron, 2013; Fishbein and Ajzen, 2010; Cervero and Wilson, 2006). Yin (2017) explained that propositions immediate attentiveness where something should be checked with the scope of the research, “reflect an important theoretical issue,” or give direction in "where to look for relevant evidence" (p 82 - 83). Table 2 describes how the propositions were linked to the participant interview prompts, the respective literature, the inquiry interrogations, and the study implementations ((Mertens & Wilson, 2012).

Table 2: a set of *a priori* propositions

Proposition	Supporting Literature	Interview questions	Research Questions
<p>The current implementation process of teaching and learning strategies highly influence the weak outcomes of the TVET curricula</p>	<p>Analysis of the teachers’ practices and experiences may provide more evidence for developing an improved model of the quality of teaching and learning skills to build their program, which helped the trainees to strengthen abilities and experiences in both situations such as social and scholarly, that delivered them the vital workforce goods needed to apply for qualified jobs (Hagos Baraki, & van Kemenade, 2013). Negative results can occur if a curriculum is not implemented sufficiently (Margolis, 2014).</p>	<ol style="list-style-type: none"> 1. How do you describe your experiences in teaching and learning in the TVET system? 2. What are the program's goals, and how do they associate with the TVET School as a whole? <ul style="list-style-type: none"> • How can teachers be adequately sustained to accomplish program enhancement purposes? • What are the overall characteristics of your educational program that combine theoretical and technical training? 	<ol style="list-style-type: none"> 1. What teaching activities do instructors utilize in Technical and Vocational Education Program in Senegal? 4. How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?
<p>The TVET curricula should align with the desired needs of the students, community development and economic growth.</p>	<p>Improving TVET systems may provide education and training throughout life. Increasingly all educational systems, including TVET systems are expected to emphasize life-long learning with cultural and environmental aspects in addition to the social and economic dimensions. TVET systems must be flexible, open, and learner-oriented to make life-long learning possible. Furthermore, the TVET system in</p>	<p>The CBA courses determine what to include in the lesson plan to train students. How much adaptability do teachers hold to incorporate materials that will allow the learners to satisfy the criteria by which promotion and accomplishment are assessed for any specialties and primordial training fields?</p> <p>How do you describe your instructional practices?</p>	<ol style="list-style-type: none"> 2. How do graduates of TVET programs describe their learning experiences? 3. How do graduates of TVET programs see their educational experiences influencing their employment and career opportunities?

	agriculture should perform solid interactions with all other training areas to invent connections and promote pathways for students.	How do the student projects advance contextualized/practiced learning of theoretical and technical topic values? What do students learn in these programs?	
Changing Role of TVET professionals can improve and facilitate the needed enhancement.	The roles of TVET are constantly changing, and a variety of tasks of TVET staff and faculties incorporates using enough time going into the agriculture industries in particular to monitor student progresses in the internships can be more beneficial for all involved in the system (Clayton et al. 2005; Harris et al. 2001).	What sorts of instructor improvement activities have you involved in to promote your pedagogy models? How do continuing professional education opportunities contribute to your experience in your position in the TVET Agricultural Schools? How do you describe the TVET funding and infrastructure in your school?	
Moving from passive teaching strategies to an engaging in more learner-centered instructional strategies in the TVET system may lead to an efficient way to instruct multiple learners.	The learner-centered approaches enhanced self-efficiency, independence, recognized competencies, motivation, and commitment (Anderson, 2013; Cheang, 2009; Dunlap, 2005). It drives enhancements in educational fulfillment and self-satisfaction (Carroll et. al., 2009; Yusuf, 2011)	What sorts of instructor improvement activities have you involved in to promote your pedagogy models? How do continuing professional education opportunities contribute to your experience in your position in the TVET Agricultural Schools? What do you think about the relevance to the labor market of the current programs?	1. What teaching activities do instructors utilize in Technical and Vocational Education Program in Senegal? 2. How do graduates of TVET programs describe their learning experiences? 3. How do graduates of TVET programs see their educational experiences influencing their employment and career opportunities? 4. How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?

Interviews

Interviews with research participants are a fundamental aspect of qualitative research (Yin, 2017; Mertens & Wilson, 2012). Patton (2014; p. 441) explains that “the standardized open-ended interview also makes data analysis easier because it is possible to locate each respondent’s answer to the same question rather quickly and to organize questions and answers that are similar.” Therefore, the interviews were implemented to gain knowledge and understanding about participants’ perception of the TVET educational program and the short, medium, and long-term impacts of the agriculture TVET educational system (Oviawe, Uwameiye, & Uddin, 2017; Huff, Zoltowski, & Oakes, 2016; Patton, 2014; Fedorov, & Davydova, 2014). Participants' interviews focused on their perceptions of the ATVET educational system. The interviews were semi-structured (Patton, 2014) and were last from 30 minutes to one hour.

After the academic literature reviews in the TVET system, the researchers developed an interview protocol regarding questions related to the ATVET programs, implementation issues, and job market trends. The researchers piloted the interview protocols to ensure clarity for participants. Finally, the interview guides were reviewed to establish validity, and changes were made based on the reviewers’ recommendations.

The researcher also conducted interviews with the participants who are selected to elicit information from the respondents. The researcher introduced the study by meeting the participants before the implementation process of the study. The meeting helped to clarify the goals of the case and may add to this trustworthiness between the researcher and participants. All participants agreed mutually on the selected location for the interviews. The selected participants were asked to engage in all interviews with individual respondents to gather information on the social and economic impact of ATVET. Besides, the condition contributed

to excellent resources for interacting to access the ATVET establishments. These interviews were pre- and post-, one-on-one, semi-structured guidelines developed for the questionnaires administered during field activities.

The interview questions were adapted from an interview script created for and used by previously published documents by obtaining relevant information to TVET educational system and major TVET institutions (Withers, 2012). Besides the investigation also described the internal constituents, like the administrative and environmental support, which changed the ATVET system and job market. The participants had the opportunity to provide the researcher with more in-depth data experience by becoming involved in the implementation of interviews. Moreover, interviews allowed the researcher more control over the line of questioning (Yin, 2017; Creswell, 2009). Indeed, they were acknowledged, provide data on the ATVET perspectives, and obtain the information to help understand the need for improving teaching practices (Mertens & Wilson, 2012; Creswell, 2009). A case study is useful in seeking practical insights to inform action because it focuses on outcomes (Tondeur et al., 2017; Ary et al., 2016; Merriam & Tisdell, 2015; Fedorov & Davydova, 2014; Patton, 2014; Yin, 2009; Yin, 2003a; Yin, 2003b).

Data Analysis

According to Nowell et al. (2017), the investigators become accustomed to the data throughout the data analysis, implementing a comprehensive description, organizing data into themes, and later describing them in the data analysis process. Therefore, a case study researcher analyzed data from interview tools using qualitative methods and data analysis beginning with the transcription of the interviews (Patton, 2014; Fedorov & Davydova, 2014). A second researcher confirmed the consistency of the coding and interpretive themes. Case study analysis provides not only themes but also a detailed description of the setting and

context (Creswell, 2009). Therefore, analytic reasoning processes were used to understand participants' experience and perception of the TVET educational system (Patton, 2014; Ary et al., 2006). The researchers transcribed the recordings of interviews by utilizing Microsoft Word. The transcripts were then coded and managed using the Atlas.ti program. Also, the lead researcher typed the notes using Microsoft Word and added them to the electronic files for safe storage.

Strategies for Validating Findings

It is essential to acknowledge that generalization and transferability are limitations of this study because validating qualitative findings are much different from quantitative data. Indeed, qualitative validity is the process in which the leader of the study controls for the exactitude of findings by applying various ways of methods to improve validity strategies into proposals. According to Mays, & Pope (2020), "Respondent validation, or member checking as it is sometimes called, includes a range of techniques... There are no mechanical or 'easy' solutions to limit the likelihood that there were errors in qualitative research. It was better to think of respondent validation as part of a process of error reduction, which also generates further original data – which, in turn, requires interpretation – rather than as a straightforward check on validity" (p. 218). By conducting interviews, the researcher brought the themes together to compare notes and the researcher's interpretation of the findings. A comparison of the transcriptions and codes was conducted to check the accuracy throughout the data collection and analysis process. In addition to these procedures, the researchers shared the data for the inter-coder agreement process (Mays & Pope, 2020; Patton, 2014; Creswell, 2009).

Limitations and Research Subjectivity

As a case study, the findings provided insight into the beginning stages of further research to prepare agricultural education teachers to integrate student-centered strategy into an agriculture curriculum. The researcher acknowledges that there were limitations to this study. Indeed, time is a limitation of this study because the researcher and participating teachers wanted to complete the study before the end of the semester. Also, qualitative research is a study of the lived experience, and the researcher is an agricultural teacher in higher education with more than ten years of experience teaching. Even though personal experiences from the study participants, it may be necessary for future research on the same institutes with new participants to compare data results. This experience afforded the researcher knowledge and skills related to the pedagogical aspect developed in the TVET institutes, but care were taken before data collection and analysis to address the bias points of view brought to the research from life experiences. The researcher aware of the interpretation of pedagogical and teaching strategies and curricula. As stated, generalization is limited, as this was a case study within the TVET education system. There needed to be further opportunities to examine the participants' actual teaching strategies results in this study.

To obtain insight into the TVET education programs for the students in Senegal and provide youth with the labor market and resources opportunities, a case study of two regions was implemented to identify possible strategic pedagogical improvement for teachers in the TVET training programs. This study assisted TVET staff and faculties in enhancing their educational program and provides programs that meet students' needs to get a job related to their field of study. Also, based on these findings, it allowed the students to choose what they want to learn before planning any educational programs. The findings informed teaching methods courses to enrich the content and make youth programs in agriculture more

appropriate to the clientele' needs. Moreover, the study required specially trained teachers to address self-confidence difficulties, other passionate, and learning necessities as the teachers developed the official subjects to play such roles.

Chapter 4: Findings

This research study examined the “development of Agriculture value chains as an asset for the sustainable development and food security: the case of the improvement of agricultural technical and vocational education in Senegal.” This research investigates the need to improve agriculture technical and vocational education programs in Senegal by focusing on pedagogical aspects and teaching strategies to address the new growing competency demands of the different value chains within the agriculture system. This chapter exhibits the findings to resolve the research questions below:

1. What teaching activities do instructors utilize in the Technical and Vocational Education Program in Senegal?
2. How do teachers describe the learning experiences of the graduates of TVET programs in agriculture?
3. How do teachers see the educational experiences influencing the employment and career opportunities of the graduates of TVET programs in agriculture?
4. How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?

The findings produce a thorough analysis of the diverse themes from the four inquiry questions and provide an in-depth comprehension of their ideas and viewpoints surrounding the challenges and possibilities of the regional TVET system. In this case study, researchers interviewed the participants for data collection. Between December 14, 2020, and January 16, 2021, they interviewed 13 vocational teachers in their environmental works. The researchers transcribed all recorded interviews and coded them to themes. A line-by-line reading was done to code, separate, analyze, and compare the data gleaned from the inquiry

implementation to classify resemblances and variations within the categories and codes. Thus, the researcher identified these themes:

- Classroom process: organization, management, and teaching methods;
- Up-to-date equipment, course materials, and infrastructures;
- Complex issues and challenges of the competence-based program;
- Acquire a valuable educational experience and good service quality;
- Hands-on training in the learning processes;
- Effectiveness of the student training program;
- Knowledge and skill Applications in the fields;
- Planning and managing activities and times, money, and other resources to achieve teaching and learning goals;
- State and school authorities' consideration and funding;
- Professional development of teachers;
- Future of ATVET, its functions, and goals.

The researchers used the identified themes to analyze the four questions in this case study. This case study was beneficial to discover several issues that are disturbing TVET teaching and learning strategies and some ways for solutions to improve them and institution functioning. The results exhibited that all participants had different years of experience in the ATVET system and education levels.

Research question 1: What teaching activities do instructors utilize in the Technical and Vocational Education Program in Senegal?

The first question of the study examined the existing teaching activities to implement the current education program. The identified themes from the interview are classroom process: organization, management, and teaching methods, up-to-date equipment, course

materials and infrastructures, and program delivery: Integration and coordination of the complex issues and challenges of the competence-based program. Indeed, the themes appeared from examining current teaching and learning approaches used to implement the program with the competency-based approach (CBA).

Classroom process: resources, organization, management, and teaching methods

The results showed that the participants had various years of positions, professional experience, and academic levels to provide information-rich cases. They are well experienced and knowledgeable for the most productive application of inadequate pedagogy resources for the competency-based (CBA) program. Teacher respondents talked about the pedagogical implications of integrating the competency-based approach (CBA) program and the attention that should be paid to practical knowledge and skills needed by teachers and administrators. The competency-based (CBA) program has large connections with the agriculture system that interviewees described. They explained the challenge of teaching that emerges from the implementation of four agriculture competencies and six major breeding skills. The training program's content was the first mentioned implication by most of the interviewees. Ouse thought that CBA program is very broad and needs to be reviewed to minimize repetition.

“He said :

“ ... le contenu du programme de formation avec l’approche par les compétences (APC) est très vaste avec 6 grandes compétences en élevage (production de viande, basse court, poulet de chair, œuf de consommation, animaux de trait et lait). Il s’y ajoute trois modules d’aviculture (chair, basse court, œuf). Il y’a trop de cours qui se répètent (anatomie des volailles en trois cours), ce qui prend plus de la moitié des heures de cours.” Meaning that “the training program's content with the competency-based approach (CBA) is very broad, with six major breeding skills (meat production, short bass, broilers, table eggs, draft animals, and milk). There are also three poultry farming modules (meat, free-range chicken, egg). There are too many repeating lessons (poultry anatomy in three lessons), which takes more than half of the lesson hours with theory”.

And Max added “dans le programme agriculture par exemple avec l'horticulture nous avons 4 compétences qui sont la production de plans ou pépinières, les fruits et légumes et

la floriculture. Ce sont ces 4 compétences qu'on doit accomplir dans ce le programme.” Meaning that “In the agriculture program, for example, with horticulture, we have four competencies. The four competencies are the production of plans or nurseries, fruits and vegetables, and floriculture. These are the four skills that must be accomplished in this program by students.”

The work environment emerged as another aspect that is not attractive to encourage people to be teachers in the TVET system. Indeed, the work environment impacts practitioners’ work in the TVET system and downgrades teachers’ roles. Also, Boy Peul complained about these conditions by explained that we must support teachers first by taking into account the work environment. The working conditions are very difficult, for example, the offices are not equipped with the necessary amenities. Niokhor emphasized, the problematic conditions and the need to enhance the environment. He said, "...it is not easy to have these amenities or meet the minimum standards to facilitate the teacher's job. The preparation and implementation of the courses are very complicated with the lack of teaching materials." In the same vein, Diarra displayed his opinion on the smooth running of the CBA program by telling:

“... seulement à notre niveau on constate que les contraintes et les obstacles environnementaux posent un problème pour le bon déroulement des programmes peuvent avoir un effet négatif leur insertion ou bien sur l’acquisition ces compétences car déjà le quota horaires du programme a été sérieusement réduite. ”

Translated to “... only at our level, we find that the environmental constraints and obstacles are a problem for the smooth running of the programs can have a negative effect on their integration or acquiring these skills because already the program schedules quota has been seriously reduced”

Besides, Almamy revealed the negative impact of the financial aspects on the working environment and program implementation. He argued that motivational working environments are indispensable for the success of the teaching, learning, and satisfactory quality of training in executing the CBA program. He illustrated his talk about “... les moyens financiers et matériels ne sont pas mis en œuvre pour cela et ça se répercute sur les objectifs

du cours et du programme. Ainsi, les heures de TP diminuent sérieusement,cette diminution se répercute négativement sur l'acquisition les compétences techniques..."

Indicating that "...financial and material resources are not implemented, which has repercussions on the course objectives and the program. Thus, the hours of practical work are seriously reduced; this reduction has a negative impact on the acquisition of technical skills"

Moreover, Ngouye discussed the financial and material means in the organization, management, and teaching methods throughout CBA program execution. Indeed, she characterized one possible impact of the lack of means in the ATVET School. He stated:

"Il arrive que le programme ne soit pas entièrement déroulé à 100% parce que les moyens financiers et matériels ne sont pas mis en place pour ces activités et ça se répercute sur les objectifs du cours et du programme. Ainsi, les heures de TP diminuent sérieusement, de ce fait cette diminution se répercute négativement sur l'acquisition les compétences techniques."

Indicated to: "...It happens that the program is not fully completed at 100% because the financial and material means are not in place in time for the course activities, and this unexpected situation has repercussions on the objectives of the course and the program. Thus, the hours of practical work are seriously reduced, so this reduction has a negative impact on the acquisition of technical skills."

And Darou stressed that "ainsi, la non disponibilité des moyens financiers et techniques entravent le bon déroulement du programme et donc de l'apprentissage et de l'acquisition les compétences des étudiants. Cette situation insensée se passe très souvent cours de l'année malgré la budgétisation de toutes les activités relatives à la pédagogie." Meaning that "thus, the unavailability of financial and technical means hamper the program's smooth running and, therefore, the learning and acquisition of students' skills. This insane situation happens very often during the year despite the budgeting of all activities relating to pedagogy."

The CBA program's implementation faced many challenges in the ATVET organization, management, and delivery in order to meet the standardization of competencies

in the country. Indeed, the problematic working conditions hinder the smooth running of the CBA program. To illustrate the inadequate teaching and learning conditions in the ATVET School, Yoro explained the urgent need to rectify the ATVET condition of management to achieve the courses' objectives and the CBA program. For instance, Yoro castigates this prolonged crisis that is slow to dissipate, with the complicity of school directors who hide the reality that we live from the academic and ministerial authorities. We are facing pressing problems from the degradation of the school, which is visible in all its sectors in general, to the demotivated teachers in particular. He said that "...le pire dans cette situation, il y'a certains directeurs qui font tout pour cacher la réalité que vivent les enseignants et les élèves dans les classes et sur le terrain." Signifying, "worst of all, some principals go out of their way to hide teachers' and students' classroom and field realities."

Darou, meanwhile, talks about the difficulties in the course of the programming of the classes. He expressed that:

"La mise en œuvre du programme pose un grand problème car on n'arrive pas à respecter le référentiel des cours avec le minimum de matériels pour atteindre les objectifs des cours et du programme. Ce que nous vivons ici comme problèmes se retrouvent presque dans toutes les écoles de formations professionnelles du pays. Nous n'arrivons pas atteindre nos objectifs de formation."

Signifying that "the program's implementation is a big problem because it is impossible to respect the course reference with the minimum of materials to achieve the courses' objectives and the program that we experience here as issues are found in almost all vocational schools in the country. We are not able to meet our training goals and objectives on time."

Mary displayed her sentiment about having insufficient institutional supports for implementing the CBA program. By closely examining the training models of the teachers in the classroom, one cannot fail to note real problems in terms of quality teaching with the deficit in teaching materials and equipment. Also, the scarcity of funds grows over time, and

the required money from the government and regional administrations was insufficient in equipping education supplies of the ATVET Schools. She explained that :

“En réalité, la pratique des APC ne se fait pas comme elles se devaient dans la mesure où nous n’avons pas le minimum de matériel nécessaire pour appliquer l’APC dans de bonnes conditions. Le référentiel des APC indique l’obligation d’avoir un certain nombre de matériels et de documents pour atteindre les objectifs fixés mais nous ne disposons même pas les 5% de besoins mentionnés dans le référentiel.”

Meaning that “In reality, the practice of CBA is not done as it should be since we do not have the minimum material necessary to apply the CBA in good conditions. The CBA teaching guide indicates the obligation to have a certain number of materials and documents to achieve its objectives. Still, we do not even have the 5% of needs mentioned in the repository.”

Moreover, Niokhor added an example from his perspective on the necessity to update their teaching environments. He talked about

“Par exemple, le référentiel dit que pour un certain nombre d’élève (80) comme notre école il faut au minimum deux enseignants par filière alors que je suis le seul enseignant en élevage. En plus le référentiel dit que pour ouvrir la filière élevage, il faut un poulailler qui répond aux normes de productions alors que nous n’avons même pas un poulailler qui ressemble à celui des paysans. ”

Translated to “For example, the reference system says that for a certain number of students (80) like our school, a minimum of two teachers are needed per sector, whereas I am the only teacher in breeding. Besides, the repository says that to open up the breeding sector, we need a henhouse that meets production standards when we do not even have a henhouse that looks like that of the peasants.”

Yoro and Darou touched a disappointing working condition in their ATVET School.

They explained that we only do the theoretical lessons most of the time, and the practical part is not done because of the lack of equipment. To more specific, Darou gave an example of this working condition:

“Le plus frustrants est le fait que nous avons un poulailler qui ne peut prendre même pas dix poulets. En plus, Il ne répond à aucun critère technique. Il m’arrive très souvent de me poser la question à savoir «les référentiels nous servent à quoi?» Translated to “The most frustrating is that we have a chicken coop that cannot take even ten chickens. Also, it does not meet any technical criteria. Very often, I ask myself the question, what are the referential (guide) used for?”

As for Ouse, he points out the contradictory situation of the path of the program. He said:

“Aujourd’hui, nous faisons le contraire du référentiel. Ceci pose un problème pour atteindre les objectifs du programme comme défini dans le référentiel des cours. En élevage, nous ne faisons que la conduite des poulets de chair que nous avons comme pratique. Tout ce que nous faisons c’est des cours pratiques. Même à l’examen de certification, c’est la théorie que font les élèves. Par exemple, Par exemple, pour ceux qui étudient l’horticulture, la classe ne dispose qu’une seule pelle et deux râteliers pour faire leurs travaux pratiques de jardinages. Ils se relaient dans la parcelle alors qu’ils devaient travailler ensemble. Ils ont un seul fut pour l’arrosage avec trois arrosoirs pour toutes les planches à cultivées. L’arrosage se fait manuellement et à tour de rôle. Ce lot de matériels est exceptionnel pour cette année avec le peu que nous avons. ”

Signifying “Today we are doing the opposite of the benchmark or referential guide. This condition poses a problem in achieving the objectives of the program as defined in the course repository. In livestock, we only do the management of broilers that we have as a practice. All we do is hands-on lessons. Even on the certification exam, that’s the theory students do. For example, for those studying horticulture, the class has only one shovel and two rakes to do their hands-on gardening work. They take turns in the parcel as they have to work together. They have a single barrel for watering with three watering cans for all the beds to be grown. Watering is done manually and in turn. This set of materials is exceptional for this year with the little that we have.”

All participants agreed that they work in a worse situation in livestock; for example, teachers finished implementing milk production lessons without seeing an exotic dairy cow or a local cow in the field. Therefore, the whole course must be done theoretically by teachers in class. This situation poses the problem of achieving training objectives. Today, it is difficult to say that we are achieving our goals in terms of skills acquired with this students' training program.

Vocational education presents many problems, especially the technical material aspects for production that we do not master. These problems could be categorized as internal coordination, coordination between local and state authorities, and finally, there is a lack of harmonization of training activities. Almany gave an example by saying: “...à l’école on nous demande de faire des productions végétales et animales alors que nous n’avons pas les intrants (matériel technique, végétal et animal) nécessaires pour une bonne production. Cette situation est paradoxale dans l’objectif de la standardisation des compétences.” Denoted to "at school, we are asked to produce plants and animals when we do not have the inputs

(technical, plant, and animal material) necessary for good production. This situation is paradoxical in the objective of the standardization of skills and competencies."

Therefore, it is necessary to review the content and plans, to adapt them to the current economic context. The participants indicated that the authorities wanted agriculture to solve youth unemployment by professionalizing skills and competencies. Thus, if there is no technical and administrative framework to train them and carry out this program, it will be challenging to solve the employment and agriculture problems with this minimum financial policy and budget for agricultural vocational schools. Nguabou complemented Almamy's concern by explaining that: "Et alors, on veut que l'agriculture puisse régler le chômage des jeunes avec une professionnalisation des compétences. ...ainsi, il sera difficile de régler ce problème avec cette politique financière minimale pour les écoles de formation professionnelle agricole." translated to "And so, we want agriculture to be able to solve youth unemployment with the standardization of skills. ...thus, it will be challenging to solve these problems with this minimum financial policy and budget for agricultural vocational schools."

Nguabou revealed that to demonstrate these disappointed working conditions by saying: "I have visited vocational training centers (CIPA) and other agricultural vocational training schools. They are in an extraordinary state of deterioration with a lack of personnel, materials, and equipment. Buildings are very dilapidated and temporary shelters in some schools. He added that *we* have moved from the classic modular system to the curriculum system with the competency-based approach (CBA). However, this is the old training system that those who designed the CBA program took and wrote on the title "*competency-based approach*." It's like they took an old green car and colored it red by letting us know that we have a new car. We used to have the objective approach, and now it's the *competency-based approach*. The accompanying deficit of this program only shows that the authorities are not

committed to solving the problem of young people in terms of employment. To achieve this objective, technical and financial resources are needed to boost and facilitate integration into the labor market.

Diarra reported that the goal is for students to be operational when they leave school. I know the program is well designed, but the authorities sabotaged its progress as planned in its design with the financial and technical means. The program responds well to the needs of students to integrate into the labor market. She proved her allegation by telling this

“Il y’a des problèmes car les écoles ne dépendent pas du même ministère mais de divers ministères de tels sorte qu’il y’a un déséquilibre. En effet, il y’a des ministères qui mettent plus de moyen financier sur les écoles que d’autres ministères qui négligent la formation agricole. Il y’a un déséquilibre financier selon la tutelle de l’école agricole. Cette situation fait que la formation agricole est négligée et les moyens nécessaires ne sont pas mis en place pour relever les défis et atteindre ces objectifs...”

Decoded to “there are problems because the schools are not under the same ministry, but from different ministries, so there is an imbalance. Indeed, ministries put more financial means on schools than other ministries that neglect agricultural training. There is a financial imbalance depending on the supervision of the agricultural school. This situation means that agricultural training is ignored, and the necessary means are not put in place to meet the challenges and achieve these objectives...”

The initial teacher training is insufficient, considering the various changes that have been undertaken. Yoro thinks that fundamental knowledge, pedagogy, didactics, psychology must have an important place in capacity-building devices. Capacity building refers to a form of teaching following the traditional model of presenting a course. The didactic contributions are linked to a systematic study of the programs. He found that the TVET training system, which is necessary for an education that must meet the pedagogical's and environment's needs and be in line with agriculture changes in the country, is fragile and is often used to attract donor funds. He explained that

“Le problème que j’ai noté dans cette expérience est le manque de pédagogie que nous avons au début de notre carrière professionnelle. En effet, nous sommes recrutés comme vacataires sans aucune formation pédagogique ou de préparation pour l’enseignement que nous sommes affectés dans les salles de classe pour former des élèves. Par ailleurs, le

renforcement de capacité pédagogique dure une année, mais il reste théorique. En effet, la formation dure dans la pratique de six à huit mois. La formation des enseignants est ainsi largement réduite du fait de retards dans le démarrage des cours. Les enseignants déplorent aussi le niveau de formation, qu'ils considèrent insuffisant."

Coded as "The problem I noticed in this experience is the lack of pedagogy that we have at the start of our professional careers. Indeed, we are recruited as temporary workers without any pedagogical training or preparation for teaching that we are assigned in the classrooms to train students. Besides, the reinforcement of teaching capacity lasts one year, but it remains theoretical. Indeed, the training lasts in practice from five to six months. Teacher training is thus considerably reduced due to delays in starting lessons. Teachers also deplore the level of training, which they consider insufficient."

Also, Mary added that "Also, Les enseignants sont sur le terrain avec toutes leurs difficultés pédagogiques mais ils ne reçoivent aucune formation sur ce plan pendant des années de services. Il nous faut des programmes de renforcement de capacité. D'ailleurs même, il est mentionné dans tous les programmes mais il n'est pas appliqué réellement alors que les enseignants ont besoin de nouveaux outils pédagogiques et des diplômes professionnels pour avancer dans leurs carrières." Interpreted to "the teachers are in the field with their pedagogical difficulties, but they do not receive any training on this plan during years of service. We need capacity-building programs. Moreover, it is mentioned in all the program plans, but it is not really applied while teachers need new educational tools and professional diplomas to advance in their careers." Mary advocated for teachers' capacity building. Besides, she explained that the teachers' capacity building, a mandatory condition to realize the objectives' achievement, has not been done. To illustrate this need, she said "Better yet, since the start of this access to skills program, I am the only one to have benefited from this training in agriculture and animal husbandry at this school. I had this pedagogical training for a better mastery of the tools used in this new approach to access skills."

This condition makes it very difficult for our work in the classroom and the student's involvement in the teaching activities. If a teacher is not fortunate enough to be chosen for training early on, he can go for years without having a single educational upgrade, as many

colleagues have experienced. Thus, the teacher cannot use various pedagogical strategies involving the learner and the teacher in the learning process.

Boy Peul continued telling that these program changes created upheaval with an adaptation phase that was not well prepared. This preparation is not easy. This is what made difficulties in the quality of the training. He explicated that

“Il est nécessaire d’avoir des renforcements de capacité continu sur la pédagogie par rapport à l’évolution des mentalités qu’il faut suivre. Il y’a aussi l’évolution des outils pédagogiques qui avancent très vites qu’il faut suivre. Il y’a aussi les moyens pédagogiques et les méthodes d’enseignées surtout à l’heure où nous sommes où les TIC sont très employés. J’ai suivi beaucoup de séminaire sur la mise en ligne des cours avec les plateformes comme les MOODLE, Canvas, MOOC etc., ou comment éditer un cours, évaluer les étudiants en ligne etc. Comment animer un cours en ligne et mettre tous les supports en ligne et le tutorat...”

Meaning that “It is necessary to have continuous capacity building on pedagogy about the evolution of mentalities that must happen. There is also the evolution of educational tools that are advancing very quickly and must be understood. There are also educational means and methods taught, especially at a time when ICTs are widely used. There is also the evolution of educational tools that are advancing very quickly that must be followed. There are also educational means and methods taught, especially at a time when ICTs are widely used. I have attended a lot of seminars on uploading courses with platforms like MOODLE, Canvas, MOOC etc., or how to edit a course, assess students online etc. How to run an online course and put all online materials and tutoring.”

Besides, she remarked that in our working conditions. She said: “je suis sûr que nous n’atteindrons jamais les objectifs de formations et mieux la situation va se détériorer. Nous avons besoins de la pratique car on parle de formation professionnelle et sans cette pratique on ne peut pas parler de formation professionnelle.” Meaning that “I am sure that we will never achieve the training objectives and the better the situation will deteriorate. We need practice because we are talking about professional training, and without this practice, we cannot speak about professional training.”

Niokhor and Ngouye are in phase with the need for continuous capacity building on pedagogy. They thought that reinforcement of teaching capacity is not systematic. This is why we find teachers who have done more than 15 years of service without benefiting from it

despite the law stipulating the opposite of what we experience in the field. Ngouye gave the example of his training opportunities by saying: “la première formation de 10 jours sur le programme de l’approche par les compétences a eu lieu en 2014 et la deuxième formation 2021 ... sept ans après la première.” Signifying “the first 10-day training on the skills-based approach program took place in 2014 and the second training in 2021 ... seven years after the first.”

Thus, all new teachers recruited during those six years have not benefited from this 10-day training concerning this new program. Despite this situation, contrary to the law, teachers are in classrooms with students without any pedagogical notion on the skills-based approach.

In addition, Niokhor claimed the urgent need for capacity-building sessions. He said:

“C’est des formations professionnelles qu’ils doivent souvent se dérouler à l’intention des enseignants parce que j’ai l’impression que les enseignants sont un peu même en retard par rapport aux étudiants sur le programme d’étude. C’est pourquoi ils se débrouillent tant bien que mal pour s’auto former sur les techniques pédagogiques.” Understood to “These are professional training that they often have to do for teachers because I feel that teachers are even a little behind the students on the curriculum. This is why they are doing their best to self-educate themselves in teaching techniques.”

He complained about their current teaching strategies by saying “Les pratiques pédagogiques, comme j’ai dit tout à l’heure, c’est des pratiques classiques. Elles n’ont pas encore évolué avec le nouveau programme.” Transliterate to “Educational practices, as I said earlier, are traditional practices. They have not yet changed with the new program.”

From the results, Niokhor mentioned that the practices are intramural and extramural techniques, study trips, trips, and many class lectures. The variation of the pedagogy with tendency decreased with the problem of logistics and the financial means, resulting in a challenging course of the program so if we manage to implement all the mean technics and financials, whether, for practical work, visits and study trips, we would like to promote to improve pedagogy. The findings revealed that participants needed communication skills because they wanted to find more effective ways to facilitate their teaching activities. They

need much more adaptive communication to teach and facilitate student understanding and class participation.

Additionally, they called for extra supports. The needed supports are mainly acquiring material information and a good Internet connection to enable the teacher to prepare these courses and implement these teaching methods. They think that teachers must have the possibility of self-training in teaching methods. Ouse specially said: “Le plus souvent l’enseignant n’a qu’une ou deux séminaires de formation pédagogique pour toute sa carrière d’enseignant. C’est-à-dire sur une durée de 15 à 20 ans de carrière.” Signifying, “Most often, the teacher only has one or two teacher training seminars for his entire teaching career. That is to say, over 15 to 20 years of employment.”

Although teachers can meet all the criteria that should lead them to do this capacity building, the academic authorities make no effort to train them. As part of this new access to skills program that we are rolling out, there is not enough capacity building for teachers. The administrative authorities choose per portion of teachers for one week instead of generalized training.

The interviewees agree about the relationship change between the teacher and the Student. The results showed that they are experiencing challenging relationships with students. Mary and Diarra emphasized that this program has made orientations with changes in our relationship with students.” Diarra claimed the required adaptation phase, which was not well prepared because of the challenging implementation of the new program. This preparation is not evident, especially on the side of the students, which has created frustrations and misunderstandings in our relationship with them. My experience has helped us to bring serenity to our relationship with our students and to avoid conflicts. She said to prove this situation that : “Les élèves ne sont pas préparés à étudier dans cette nouvelle

situation d'apprentissage. On leur laisse du temps consacrer à leur recherche personnelle pour mieux maîtriser les différentes compétences du programme. Cette liberté d'apprendre en réalité ne les profite pas car ils ne sont pas préparés à cette situation comme nous enseignants avec cette approche." Coding to "Students are not prepared to study in this new learning situation. They are given time to devote to their research to better master the various skills of the program. This freedom to learn does not benefit them because they are not prepared for this situation like us teachers with this approach."

Moreover, Max displayed his belief about the relation. He mentioned that the access Skills-Based Approach program changed the relationship between students and teachers. He said that :

"Il y a une plus grande complicité dans le respect du cadre éducatif. Les étudiants participent davantage à la conception et au déroulement du cours et au choix du contenu... Ensuite, nous discutons du plan et du contenu du cours en présentant le syllabus. À partir du plan de cours, j'explique la logique de ce plan et le contenu. Parfois, je change même une partie du contenu à la demande des étudiants."

Translated to "There is greater complicity in respecting the educational framework. The students participate more in the conception and course of the course and the choice of the content... Then, we discuss the plan and the contents of the course by presenting the syllabus. Starting from the course plan, I explain the logic of this plan and the content. Sometimes I even change some of the content at the request of the students." The course plan may change from year to year due to this demand from the students as it is always according to the students' center of interest that I evolve repeated, Max.

As another aspect revealed by the results is that this new situation pushes students to take more interest in the content to follow with great attention. Then, the students are freer to ask questions or start productive discussions. These are constructive teaching practices and allow them to participate better in the course by emphasizing their center of interest. NGabou and Darou exposed their experiences with students in the BCA program. They have better class participation, and students are more willing to engage in actions involving lab activities. Ngabou added that "Pour choisir un élément de contenu, on se base sur les objectifs

spécifiques et également on s'oriente par rapport aux besoins des étudiants. Dés fois les étudiants posent certaines questions qui nous permettent de nous orienter ou ils nous indiquent leurs centres d'intérêt en nous donnant des éléments à intégrer dans le cours." Indicate that "To choose a piece of content, we base ourselves on the specific objectives, and also we orient ourselves towards the practical needs of the students. Sometimes the students ask certain questions that allow us to orient ourselves. They indicate their centers of interest about practical hands-on training to us by giving us elements to integrate into the course.

And Darou completed about it. He said "Cet échange avec les élèves peut amener à changer le volume des contenus en réorientant les parties du cours par rapport aux centres d'intérêt des étudiants. Malgré tout nous sommes tenus de respecter les objectifs du programme et ceux du cours." Meaning "This exchange with students can lead to changing the volume of content by reorienting parts of the course concerning the students' interests. Despite everything, we are required to respect the objectives of the program and those of the course."

Yoro continued in the same vein. He has experienced that

"Parfois, les élèves veulent changer l'organisation des tables bancs dans la classe pour faciliter leur apprentissage. Cependant, cette nouvelle organisation de la classe pose un grand problème à cause des salles de classes que nous disposons. Nos salles de classes ne répondent pas aux critères prévus par l'approche par les compétences. Nous avons des abris provisoires avec trois ou quatre élèves par table banc qui est très loin des standards pédagogiques ou le minimum qu'il faut pour réussir notre mission de formation dans ce programme."

Translate to "Sometimes students want to change the organization of table benches in the classroom to make learning easier. However, this new organization of the class poses a big problem because of the classrooms. Our classrooms do not meet the criteria provided by the skills-based approach. We have temporary shelters with three or four students per table bench, which is very far from the teaching standards or the minimum necessary to succeed in our training mission in this program."

Boy Peul discussed his practice to push students to be more interactive in class. He explained that students appreciated the different discussion methods. He said "

“Chaque cours, ils apportent un élément nouveau pour leur sensibilisation sur l’importance de l’agriculture dans l’économie et la vie sociale du pays. De ce fait, j’essaie toujours de créer un débat pour mieux les faire comprendre les enjeux et l’importance de l’agriculture dans leur vie quotidienne et les possibilités qu’ils ont pour réussir dans la vie professionnelle. Cette contribution des élèves me poussent à parfaire mes pratiques pédagogiques.”

Meaning “In each course, the students bring new elements to their awareness of the importance of agriculture in the economy and social life. Thus, I always try to create a debate to make them better understand the issues and importance of agriculture in their daily lives and their possibilities for success in professional life. This student contribution pushes me to improve my teaching practices.”

Mary thought that the teachers who are most emotionally involved are the most motivated and satisfied with their work. Thus, if the student feels the reassuring gaze of the teacher, it helps him overcome his difficulties and stay focused on his task. So that, there is mutual support, which is what made my students help me master computer tools and internet research. They pushed me to progress in the use of new technologies and communication.

Mary shared her experience by saying that:

“...j’ai pu maîtriser l’utilisation de l’internet grâce à mes élèves. Je ne pouvais pas ne pouvoir l’utiliser mais les élèves étaient très adépte de l’utilisation du net avec des résultats de recherche très avancés comparés à ce que j’avais au début. Avec leur recherche, nous avons pu développer une espace d’échange très riche. Cette espace d’échange m’a permis d’être plus en contact avec les élèves pour les motiver, les guider, aider dans leur sociale et les encourager à persévérer dans les études. Une autre chose que j’aime est la considération que j’ai de mes élèves avec une ouverture d’esprit plus grand et positive à cause de l’expérience que j’ai gagnée en devenant un enseignant.”

Signifying “...I was able to master the use of the Internet with support from my students. I couldn't use it, but the students were adept at using the net with very advanced search results compared to what I had initially. With their research, we were able to develop a vibrant space for discussion. This space for discussion allowed me to be more in touch with the students to motivate them, guide them, help them socially and encourage them to persevere in their studies. I also like considering I have of my students with a more open and positive mindset because of my experience from becoming a teacher.”

All participants agreed, the extra classroom activities that students carry out with their teacher significantly improve their learning. These activities put them in real situations of conviviality and fraternity. Consequently, it motivates them to engage more in class, and this

commitment allows teachers to orient the strategy towards certain activities where they are more motivated.

The participants agree that innovative teaching practices aim to improve teaching devices and adapt them to the needs of students. Thus, this new program prompts us to place educational innovation at the center of our thinking because the transformation of agricultural professions is accelerating. Teachers believe that their teaching methods must evolve because the world evolves. Ouse talked about choosing teaching strategies by saying that

“Les techniques pédagogiques.... Oui, tu sais nos cours sont plus théoriques que pratiques. En remplissant ma fiche pédagogique, je dois indiquer les stratégies à utiliser pendant le cours à savoir le travail de groupe, les exposés, les démonstrations etc. En fait, tout dépend des objectifs spécifiques que l’enseignant a fixés pour le cours. Ce choix des stratégies dépend de l’enseignant et non du programme mais en rapport les objectifs du cours, des objectifs du programme et le matériel que nous disposons pour faire le cours.”

Meaning that “Educational techniques.... Yes, you know our lessons are more theoretical than practical. By completing my pedagogical sheet, I must indicate the strategies to be used during the course, specifically group work, presentations, demonstrations, etc. It all depends on the specific goals the teacher has set for the lesson. This choice of strategies depends on the teacher and not on the program but in relation to the course's objectives, the objectives of the program, and the material we have available to teach the lesson.”

Max stressed the students are varied-level in the same classroom because of their level of recruitment and enrollment. Indeed, they sometimes have classes with very different levels, such as the third high school level up to the terminal level or below this third level. This diversity means that they have more theoretical courses than practical, because they lacked a scientific basis. He talked in this term

“Ces techniques facilitent la participation des élèves surtout dans les classes où le niveau des élèves est assez homogène. Il ne faut pas oublier que le niveau des élèves est varié à cause de leur niveau de recrutement. En effet, nous avons des classes parfois avec des niveaux très différents tels que le niveau de troisième secondaire jusqu’ au niveau de terminal ou un niveau de inférieur au niveau de troisième. Cette diversité fait que nous avons des cours qui sont plus théoriques que pratiques. Par ailleurs, nous avons des cours de niveau universitaire dans le programme. Cette diversité de niveau pose un grand problème pour harmoniser l’apprentissage des élèves. Beaucoup d’élèves n’ont pas la base scientifique nécessaire pour comprendre certains cours, c’est pourquoi on fait de notre mieux avec des activités en marge des cours pour les aider mieux compréhension.”

Denoted to “These techniques facilitate the pupils' participation, especially in the classes where the level of the pupils is relatively homogeneous. We must not forget that the level of the students is varied because of their level of recruitment. Indeed, we sometimes have classes with very different levels, such as the third secondary level up to the terminal level or below the third secondary level. This diversity means that we have courses that are more theoretical than practical. Besides, we have university-level courses in the program. This diversity of levels poses a significant problem in harmonizing student learning. Many students do not have the necessary scientific basis for understanding specific courses, so we do our best with activities outside of the class to help them better understand.”

Diarra exemplified in the same way by talking about the used tools in class to limit the impacts of the lack infrastructure and equipment. She said “Un autre exemple, en élevage nous allons des images de la poule, du lapin... pour mieux expliquer le contenu comme nous n'avons pas de poulet à l'école qui pourrait nous servir dans l'illustration de nos cours.”

Elucidated to “Another example, in livestock, we use images of the hen, the rabbit ... to better explain the content as we do not have chickens in school that could illustrate our lessons.”

Furthermore, the findings revealed that key aspects of classroom instruction, such as close monitoring, classroom pace and management, clarity of presentation, and course structuring, have positively impacted student success. They are the most visible facets of effective teaching. Participants agree that no single, precise way to teach best as many teaching practices are complex for students to observe and assess. Yoro clarified the need to teach best requires good teaching tools in the classroom. Therefore, he said

“Le changement d'outils pédagogiques nous permet de gérer des groupes classes dans lesquels certains élèves n'ont pas atteint tous les objectifs d'apprentissage ou des niveaux d'étude différente. Ainsi, les enseignants mettent en œuvre un cadre souple pour aider les élèves de niveau inférieur par rapport à la classe. Ils mettent les apprentissages suffisamment explicites et diversifiés pour que les élèves apprennent selon leur propre rythme. Les élèves approprient plus facilement les savoirs et les savoir-faire en relation avec les compétences.”

Explicated to “The change in teaching tools allows us to manage groups of classes in which some students have not achieved all learning objectives or different levels of study. Thus, teachers implement a flexible framework to help lower-level students compared to the class. They make learning sufficiently explicit and diversified for students to learn at their own pace. The pupils more easily appropriate the knowledge and know-how concerning the competencies.”

Darou explained the challenges faced in implementing the CBA program. Most lessons are lecture classes, but teachers should do more field works and lab. He said that “Les cours se déroulent essentiellement en théorie alors que le référentiel nous demande de faire 30% de théorie et 70% de pratique et lab.” Signifying that “The courses take place mainly in-class lectures, whereas the reference CBA guide asks us to do 30% of lectures and 70% of practice and lab.” Ngouye gave the reasons for this problem. Indeed, the cause of this situation is the lack of teaching material because the practical objectives of agriculture are specialty measured on four skills. They are horticulture, seedling production, vegetable production, and fruit and flower production. However thus, we need animal and plant material to be able to do the practical production work.

Boy Peul related the necessity enhance practices in the classroom. He said “...le cours d’anatomie est très complexe et nous avons beaucoup de difficulté pour la compréhension de ce cours surtout avec l’absence de travaux pratiques. Nous ne les faisons pas à cause du manque de matériel adéquat. Ainsi, pour lever ces difficultés nous faisons des synthèses du cours ou choisissons des contenus de niveaux inférieurs pour faciliter leur compréhension... malgré que nous sachions les insuffisances du contenu qui répond en partie aux critères de compétences liées à l’anatomie.” Interpreted that “...the anatomy course is very complex, and we have a lot of difficulties understanding this course, especially with the absence of practical work. We do not do this because of the lack of good material to do the practical work. Thus, to overcome these difficulties, we make summaries of the course or choose lower-level content to facilitate their understanding ... although we know the inadequacies of the content, which partly meets the criteria for skills related to anatomy.” Max added this example to show his manner to select the course contents. He said that “Par exemple pour mon cours de biologie végétale, les objectifs ont été définis. Ainsi à partir de ces objectifs, je formule les

objectifs spécifiques pour ce cours en utilisant mon syllabus pour choisir son contenu qui est modulable pour l'adapter aux contextes.” signifying that For example, for my course in plant biology, the goals have been defined. So from these objectives, I formulate the specific objectives for this course by using my syllabus to choose its content which is flexible to adapt to the contexts.”

Participants focused on the elements relevant to the teachers themselves and their immediate working environment. They illustrated the various types of factors connected to the classroom processes to the diverse pedagogy approaches applied in teaching and learning conditions and settings. Concerning the course content, the teachers determined the course contents according to the syllabus, from the objectives set by the training program focusing on practical activities.

Up-to-date equipment, course materials, and infrastructures

According to the teachers interviewed, the major decisions in terms of agricultural vocational training result from several factors, particularly the lack of monitoring of teachers, the absence of support measures with the construction of schools, and the consequent recruitment of qualified teachers. The deficit in terms of textbooks in the program, essential teaching supports, and other teaching tools, etc., because it is not easy to access some moderately improved course materials. Niokhor expressed that our classrooms are not well equipped to meet the standards of agricultural skills training. Classrooms, in general, receive more than double of students their average capacity, which complicates the conduct of our courses in good working condition. Classes last an average of 2 to 3 hours per session with all its share of inconvenience. Students are crowded into the classroom due to a lack of infrastructure. Thus, supervision becomes very difficult for the teacher because the temptation

to cheat is great. When students are close to each other, physically during homework, control is difficult or complicated. For example, he said that :

"Je dois crier pour que les étudiants puissent entendre correctement pendant la durée du cours (rire....). Quand, je dois faire cours dans ces conditions pour vous dire je suis très stressé. Je sais d'avance que je vais crier ou parler très fort pendant longtemps surtout en tronc commun avec les matières transversales. A la fin de mon cours, je suis complètement épuisé. Un autre fait à souligner dans ces conditions de travail se passe pendant les devoirs."

Implied as "I have to shout so that the students can hear correctly during the course (laughter...). When I have to take lessons under these conditions to tell you I am much stressed. I know in advance that I will shout or speak very loudly for a long time, especially in common core with cross-curricular subjects. At the end of my course, I am completely exhausted. Another fact to underline in these working conditions occurs during class controls or exams."

The findings reveal that the CBA program is well defined, but the course content is the teacher's responsibility. This program brought about fundamental reforms in terms of objectives and training systems; therefore, it is necessary to review the content and standardize them to adapt them to the current context of agricultural activity. The interviewees explained that the teacher must choose the content according to the homogeneity of the level of the class, the teaching techniques available to him, and the practical work material available. Thus, each year the content of the same course may vary depending on these parameters. At this level, a teacher may have differences in content with other training schools because the levels of the students may differ. Niokhor exhibited this problem by saying that "Ces problèmes ne se manifestent qu'au moment de l'examen final de certification. C'est pourquoi on attire l'attention des autorités et les responsables de la formation professionnelle pour harmoniser les contenus mais jusqu'à présent nous n'avons pas encore l'oreille attentive de ces personnalités et responsables" Described as "These problems do not manifest themselves until the final certification exam. This is why we are bringing the attention of authorities and those responsible for vocational training to harmonize

the content. Still, so far, we do not yet have the attentive ear of these personalities and officials.”

Participants believe it is about achieving goals by allowing all students to achieve their learning goals differently. They opt for a constructivist approach to knowledge and its modes of acquisition, taking into account multiple ethnic, philosophical, and cultural dimensions. That’s why Niokhor thought that “Cette formation doit être accompagnée de manière équilibrée d’une formation à la pédagogie, mettant l’accent sur les pratiques de la classe, sa gestion et des modèles tels que la différenciation.” Interpreted as “This training must be accompanied in a balanced way by training in pedagogy, emphasizing classroom practices, its management, and models such as differentiation.” Nguabou added his pedagogical activities by stating that

“Dans mes activités pédagogiques, j’utilise les images, raconte des histoires pour mieux étayer le contenu, créer des chansons aussi pour attirer l’attention des élèves, ou faire des études de textes. Je présente en classe un texte dont le titre est le caméléon d’Ame Pathé BA pour illustrer le long chemin à prendre avant d’atteindre ces objectifs. Il donne des leçons ou des conseils en prenant toutes les précautions pour avancer dans la vie, en respectant tout le monde et il ne faut pas admettre ou agir comme si on existait seul sur la terre. Il faut être quelqu’un de social et respectueux pour tout le monde aussi bien en classe comme à l’extérieur.”

Denoted to “In my teaching activities, I use images, and I tell stories to better support the content, create songs to attract the pupils’ attention, and study texts. It is, therefore, about achieving goals by allowing all students to achieve the same goals through different routes. I present in class a text entitled The Chameleon of Ame Pathé BA to illustrate the long road to be taken before reaching these goals. He gives lessons or advice, taking all precautions to move forward in life, respecting everyone, and you should not admit or act as if you exist alone on earth. You have to be a social and respectful person for everyone, both inside and outside the classroom.”

Ouse talked about the availability of educational material, and field visits constitute a weak link in vocational training. He thought that they do not have enough classes in which to teach, so we are using the temporary shelter class to make up for this deficit. This situation puts a lot of challenges in the schedule on the normal course of the training program, and it creates delays with a postponement in the annual programming and schedule of the classes.

Most of the premises planned have not been completed in almost all vocational training schools in the renovation because we are experiencing the same situation at the national level of infrastructure, equipment, and teaching material. Max elucidated this difficult situation coped by the teachers in the ATVET. He said that

“Max Lorsque nous avons la combinaison de l'agriculture et l'élevage, on n'avait pas de problème mais depuis que avec l'approche par les compétences nous avons fait la séparation entre l'agriculture et l'élevage. Cette séparation a créé des problèmes techniques dans la mesure où l'agriculture ne dispose pas d'espace pour faire les pratiques. Le manque d'infrastructure et d'équipement rend difficile notre travail, ainsi on essaie de trouver des solutions alternatives. Comme, il est beaucoup plus facile de le faire les pratiques avec l'élevage bien vrai que ils n'ont pas les locaux nécessaires, nous faisons recours au poulailler local.”

Resumed to “When we combine agriculture and animal husbandry, we had no problem, but with the skills approach, we have made the separation between agriculture and animal husbandry. This separation created technical issues insofar as agriculture does not have space to do the practices. The lack of infrastructure and equipment makes our work difficult, so we try to find alternative solutions. As it is much easier to do the practices with the breeding, although they do not have the necessary premises, we use the local henhouse.”

All participants agreed about teachers' experience in their early job position. They explicated that most often, in the beginning, the teacher has an educational tutor to help him prepare for these lessons. These tutors fail to meet the challenge of the shortcomings and inexperience of these teachers who need pedagogical capacity building. The majority of new recruits do not have any help in the direction of pedagogy. The majority of recruits have no support in teaching and are left on their own to get by until they have an educational capacity building, as I have experienced.

All participants agreed about teachers' experienced working in hard physical and instructional conditions. Indeed, the lack of infrastructure, equipment, and class facilities do encourage people to try to find alternative solutions. Besides, students are crowded into the classroom due to a lack of infrastructure because of the order from the authorities to enroll students as much as possible to increase financial means.

Complex issues and challenges of the competence-bases program

All interviewees used the same curricula, the same program using the same standards, and teach agriculture techniques differently. To clarify this teaching condition, Darou explained that “Les autorités de l'état ont mis à notre disposition le programme mais c'est nous qui choisissons le contenu des cours. On se base sur la connaissance pédagogique que nous avons appris à l'école, l'accompagnement des collègues à travers une cellule pédagogique et les recherches que nous faisons sur l'internet. On utilise toute cette documentation pour choisir le contenu de mes cours.” Expressed as “The state authorities have made the program available to us, but we choose the content of the courses. It is based on the pedagogical knowledge we learned at school, the support of colleagues through an educational unit, and the research we do on the Internet. We use all this documentation to choose the content of our courses.”

And Ngouye added that “...un programme avec les compétences, les éléments de compétences et les objectifs spécifiques. Maintenant on se base sur les objectifs spécifiques pour choisir le contenu de nos cours. C'est pourquoi nous avons le même programme mais on n'a pas les mêmes contenus parce que plusieurs paramètres liés au milieu et le niveau des élèves entre en jeu. Par exemple moi qui suis enseignant dans cette région peut ne pas avoir le même contenu que celui qui est au nord du pays.” Translated to “...a program with specific skills, skill elements, and goals. Now we base ourselves on the specific objectives to choose the content of our courses. This is why we have the same program, but we do not have the same content because several parameters linked to the environment and the level of the students come into play. For example, a teacher in this region may not have the same content as the teacher in the north.”

The results showed that participants stood the challenges in choosing the content of the courses. Indeed, they suggested in their pedagogical discussion group to harmonize them.

Interviewees explained that we have created an educational group for agriculture and livestock. This group is a national group where the agriculture and livestock teachers of the country discuss the problems they face in teaching work. This group allowed us to have discussions to strengthen our educational level. Thus, we use educational sheets that serve as a support for discussion or share content, and then we discussed them to harmonize the content nationally.

Mary gave an example of his colleague how shared his course content in the group discussion. She said that:

“...il y a un collègue qui a partagé son contenu en production de poulets de chair et nous avons donné des propositions d’amélioration sur l’installation des bâtiments avec des dessins et des schémas d’illustration. Ainsi, beaucoup d’enseignants ont adopté ce contenu afin d’harmoniser ce cours... Je pense que si on pouvait faire la même chose pour l’agriculture ce serait une bonne chose et cela va nous permettre d’harmoniser les contenus. Si on continue à travailler dans ce sens nous finirons par obliger les autorités académiques à nous suivre de notre logique de faciliter l’apprentissage des élèves.”

Explicated to “...a colleague shared his content in broiler production and gave improvement proposals on the installation of buildings with illustrative drawings and diagrams. So many teachers have adopted this content in order to harmonize this course... I think that if we could do the same for agriculture, it would be a good thing, and it will allow us to harmonize the content. If we continue to work in this direction, we will force the academic authorities to follow us in our logic of facilitating student learning.”

Almamy believes that “L’harmonisation des contenus va faciliter les examens de certification. Il va nous aider surtout au moment de corriger. Ainsi, elle va permettre de juger les élèves sur les bases. Les élèves auront le même programme et les mêmes éléments de contenu pour faciliter la correction des examens. Cette situation confuse sur les contenus montre bien les difficultés que les enseignants ont par rapport aux choix des contenus les cours. Il faut noter que le programme requiert beaucoup plus de pratique de théorie malheureusement les conditions ne nous permet pas de faire beaucoup de de pratique. Par exemple sur le piquetage d’un terrain ou d’une parcelle maraîchère, nous le faisons théoriquement mais pas sur le plan pratique car nous ne disposons pas d’espace pour faire cette pratique.” Signifying “Harmonization of content will facilitate certification exams. It will help us, especially when correcting. The control of these challenging conditions in the implementing lesson plan further accentuates the phenomenon of resilience and harmonizes

students' performance in the CBA program. Harmonizing the course contents, self-training, and the desire to always stay current in teaching strategies must guide his posture as a modern teacher.

Research question 2: How do teachers describe the learning experiences of the graduates of TVET programs in agriculture?

Acquire a valuable educational experience and good service quality

The findings showed that all interviewees about the positive feedback that they got from the students. They explained that the students give us positive feedback on the program despite its heaviness for some. Also, they agreed that the program could guarantee the competencies to the students considering their level of graduation. However, they expressed difficulties in achieving the program's objectives because of students' levels that are not homogeneous. In reality, the goal of this program is 100% student success in the certification exam and no dropouts. They resumed this goal in terms of not having the right to see students fail in their studies. Participants are charged with finding solutions for all learning and pedagogical problems for total success.

The interviews showed the student's beliefs about the value of schooling and learning TVETs. Their opinions included questions on their behavior towards school activities and their behavior towards schooling and learning outcomes. The results revealed that the students believe the school gave them the confidence to make decisions, the love of having good grades, and performing well. Also, they had a favorable opinion of the agricultural training and of what they had learned there. Students think that making an effort in the field is essential and that they have learned things that will be useful to them in their professional life. To illustrate these positive convictions for ATVET, Darou developed that “Les élèves qui réussissent perçoivent souvent l'école comme essentielle à leur futur bien-être. Cet état

d'esprit se reflète ensuite dans leur participation aux cours et aux activités, mais également sur leurs motivations à vouloir créer une ferme agricole.” Explicated to “Successful students often perceive school as essential to their future well-being. This state of mind is then reflected in their participation in courses and activities and their motivations for creating an agricultural farm.”

Students think that working hard in school will help them get a good job. This hard work can only be done by students in a favorable environment with all the necessary amenities. Thus, Ngouye thinks that the student's lack of sense of connection with his school is a harbinger of depression in his work environment. Students worry about their educational condition to engage in a prosperous world. Indeed, students evolved in an unfavorable environment with the lack of necessary amenities. Ouse exemplified these facts by claiming that

“Je sais que c’est un problème pour avoir un jardin pour leurs travaux pratiques. Il est très difficile de trouver un champ. C'est pourquoi on nous prête des champs par des bonnes volontés pour faire les activités pratiques de nos cours. A cette situation pose un problème à la filière agriculture d’où le grand nombre d’élèves à la filière élevage. Il est difficile de faire de l'agriculture à cause de l’accès limité des terres. Les élèves aiment bien la formation agricole, cependant leur principal souci est trouver des terres pour faire des activités agricoles après leur formation. ”

Meaning that “I know it's a problem to have a garden for their labs. It is challenging and tough to find a field for a greenhouse. This is why goodwill persons loan us fields to do the practical activities of our courses. This situation poses a problem for the agriculture sector; hence many students enrolled in the breeding sector. It is difficult to do agriculture because of the limited access to land. The students enjoy agricultural training... However, their main concern is finding a land of farming activities after their graduation.”

Other participants thought that the students’ feelings are the results of obtaining sufficient water on the farm. They declared that for those who live in the Diourbel region, the main problem is access to water, especially clean water. Thus, Mary described the situation by telling “Il est difficile de d'avoir de l'eau et celle disponible est salée. ...car l'eau disponible

n'est pas appropriée pour le maraîchage.” Characterized as “it is not easy to get water and the water available is salty. ...because the available water is not suitable for market gardening.”

The structured teaching oriented towards the CBA program targets refers to the fact that teachers keep in mind the objectives linked directly to student learning when they present the course. Thereby, the quality of teaching depended on a favorable classroom atmosphere and student-centered, placing learners and their needs at the center of its concerns. Teachers can add these quality considerations in the learning environment following the course of preparation of the program guide. Thus the teachers prepare their lessons with the educational guide on which we must mention and explain all the educational aspects to animate the class. Thus, Almamy recapitulated his practices in this term

“Nous suivons le guide de préparation de cours du programme. Je fais des préparations avec des fiches pédagogiques sur laquelle on doit programmer pour bien animer la classe. Cette préparation nous facilite la tâche pour atteindre les attentes des autorités. Il facilite également l'engagement et la participation des élèves dans le déroulement du cours. Parfois, on est surpris le niveau de participation des élèves... qui est excellente et nous pousse à changer l'approche pédagogique prévu en plein cours.”

Described as “We follow the program's course preparation guide. I make preparations with educational sheets on which we must program to animate the class properly. This preparation makes it easier for us to meet the authorities' expectations. It also facilitates the engagement and participation of students in the course of the course. Sometimes we are surprised at the level of student participation... which is excellent and prompts us to change the pedagogical approach planned during the class lecture.”

Boy Peul added the same vein in adapting to the students' engagement by changing the pedagogical approach with a more accessible course. He gave the example of starting a class by questioning students. He said that

“...en posant des questions on se rend compte que les élèves ont une bonne compréhension des thématiques que nous avons développées dans le cours, surtout quand ils donnent des réponses beaucoup plus pertinentes ou mieux adaptées que celles que nous avons prévues comme réponses possibles suivant leur niveau. Ensuite, je prends la réponse de l'élève au lieu de la réponse que j'avais préparée et la soumettre à la classe avec un encouragement de élève. Les élèves très souvent donnent des réponses beaucoup plus intéressantes que celle que j'avis prévues. Il se trouve quand je change d'approche et de technique pédagogique ce sont les élèves eux même qui déroulent le cours.

Ce changement m'aide à voir leurs limites par rapport aux compétences et de les corriger à temps. Ceci est parfois des indices qui nous aident à comprendre le niveau de compréhension des élèves. J'utilise très souvent la stratégie participative avec une implication à 100% des élèves. ”

Explicated to “...by asking questions, we realize that the students have a good understanding of the themes that we have developed in the course, especially when they give answers that are much more relevant or better adapted than those we have foreseen as possible answers according to their level. Then I take the student's response instead of the response I had prepared and submit it to the class with student encouragement. Students very often give much more interesting answers than I expected. When I change my approach and my teaching technique, the students run the course. This change helps me see their skill limits and correct them in time. Sometimes these are clues that help us understand the level of understanding of the students. I very often use the participatory strategy with 100% student involvement.”

Hands-on training in the learning processes

According to participants, students reported that their teachers maintained high achievement expectations for every student in the CBA program. Teachers encourage students to give the best of themselves and care about each student's learning, despite the fact that environmental conditions are not satisfied. Niokhor demonstrated the conditions of works with the students in the classroom. He said that

“J'utilise le plus souvent l'approche participative parce que cette méthode me permet d'inclure tous les élèves dans le processus d'apprentissage et de les contrôler leur niveau de compréhension pour les techniques pratiques. Je gère leur nombre de participation pour mieux les guider à bien assimiler les compétences en cours. Par exemple, je donne une idée sur les techniques culturales la plus part. Puis, je leur demande de réfléchir par rapport à cette idée et faire une synthèse de leurs idées pour faire les travaux pratiques. Cela donne une bonne relation entre les pratiques et les résultats de l'apprentissage.”

Signifying that “I use the participatory approach most often because this method allows me to include all students in the learning process and monitor their understanding of practical techniques. I manage their number of participants to guide them better to assimilate the skills in progress properly. For example, I give an idea of the gardening techniques most of the time. Then, I ask them to reflect on this idea and synthesize their ideas to do the practical work. This engagement gives a good relationship between practices and learning outcomes.

The level of engagement in the modules is evident in the little hands-on activities we have claimed Darou. Also, he explained that they are integrated concerning agricultural professions or the appropriation of farming jobs. He talked that “...Ainsi, ils apprennent bien

leurs leçons et participent très bien activités de terrain suivant les indications de l'encadreur ou de l'enseignant avec respect et courtoisie. La participation des élèves est très satisfaisante parce que dans mes cours il y'a une familiarité dans la classe. Cela les aide à bien maîtriser les compétences en jeux avec les incertitudes de l'environnement pédagogique.” Meaning that “...Thus, they learn their lessons well and participate very well in field activities directed by the mentor or teacher with respect and courtesy. Student participation is very satisfying because, in my lessons, there is familiarity in the classroom. This helps them to master the skills of games with the uncertainties of the teaching environment.”

The findings revealed that classroom environments and teaching materials that are not conducive to learning are demanding, particularly on all students on practical aspects because they do not have the family and community resources to compensate for them. Thus, these deficiencies mean that students are deprived of the learning opportunities they so badly need to find work quickly and easily. Yoro explained that the problematic development of the courses with blockages here and there that affects student learning. He continued in characterizing the teaching situations. He explained that we have an excessive number of students with more lecture classes than the number of classrooms available, including temporary shelters. This situation means that classroom courses are privileged over practical work activities, which require a lot of technical and financial resources.

Yoro emphasized that “Le matériel pédagogique ne suffit pas et très souvent nous sommes bloqués dans nos activités pour dérouler les enseignements correctement. Ainsi, les matières techniques sont privilégiées par rapport aux matières transversales malgré qu'elles aient leur importance. Je sais que les classes surchargées d'élèves ne peuvent suivre ce programme dans de bonne condition d'apprentissage.” Clarified as “The teaching material is not enough, and very often, we are blocked in our activities to carry out the lessons correctly.

Thus, technical subjects are preferred over cross-cutting topics despite their importance. I know that overloaded classes of students cannot follow this program in good learning conditions.” Therefore, the participants ensure all students’ learning processes and opportunities to repeat the activities until achieving competencies.

Consequently, weak students are mainly due to inadequate teaching practices through the lack of capacity-building of many teachers. Teachers are doing more practical homework to remedy this situation and ensure relevant development in student learning. Darou speaks like this to explain this situation in order to find quick and easy solutions to help students through homework, exams, and other course grades. He said that

“...le lien est tiré le plus souvent des interrogations que nous faisons à savoir la compréhension et la maîtrise de la compétence technique. Par exemple, on demande l’élève de nous décrire un itinéraire technique pour montrer le lien qui existe entre l’apprentissage et la technique pédagogique. L’itinéraire technique peut être une production végétale telle que la production carotte ou animale tel que la production de poulet de chair. Ceci nous permet d’évaluer l’efficacité de la technique que nous avons utilisée en classe. Si l’élève montre des faiblesses à décrire le processus, moi en tant que enseignant je dois trouver une technique qui va faciliter l’assimilation de la compétence avant de pouvoir continuer dans le programme car la progression dépend de la maîtrise des compétences et non du déroulement du cours.”

Understood as “...the link is drawn most often from the questions that we make, namely the understanding and mastery of technical competence. For example, we ask the student to describe a technical route to show the link between learning and teaching technique. The technical plan can be plant products such as carrot production or animal production such as broiler production. This allows us to assess the effectiveness of the technique we used in the classroom. Suppose the student shows weaknesses in describing the process as a teacher. In that case, I must find teaching techniques that will facilitate the assimilation of skills and competencies before continuing in the program because the progression depends on the mastery of the skills and not on the ongoing course.”

The findings showed that students must master the skills in progress before continuing to progress in the program. Indeed, the program asks teachers to stop making progress in their lessons until students master the skills, even if necessary, to change the instructional technique used for this course. Max talked about his experiences at the beginning of his teaching activities. He told that

“Il m’est arrivé en premier année avec la production de viande à changer de méthode d’enseigner en passant de l’exposé de l’enseignant à l’exposé des élèves avec travail de groupe. ...Au début de ce cours, on m’avait dit que les compétences nécessaires sont déjà installées alors que la notion de fourrage dans la partie alimentation n’était pas installée comme une compétence acquise par les élèves. J’étais obligé de faire ce cours avec les aliments de bases, les concentrés et les fourrages avant de continuer avec mon cours... Il est impératif que les élèves maîtrisent les prérequis selon le canevas standardisé du programme ACP avant de continuer sur les compétences qui suivent ces prérequis. Parfois cette situation impose l’enseignant est obligé de changer de méthode pédagogique pour dérouler son cours.”

Translated to “In my first grade with meat production, I changed my teaching method from a teacher's talk to a student talk with group work. ...at the start of this course, I was told by my colleague that necessary skills are already installed while notions of forage in feeding animal parts were not accomplished as skills acquired by the students... I was required to take this course with staples, concentrates, and forages before continuing with my lesson. Students must master the prerequisites according to the standardized framework of the CBA program before continuing on the skills that follow these prerequisites. Sometimes this situation requires the teacher to change his teaching method in order to conduct his course.”

Place a new agricultural training program portend well for better quality learning in the system because more practical and related to professional life. However, the availability and quality of material resources such as teaching materials and class sizes pose a problem in teacher satisfaction in the classroom. Thus, the didactic equipment also remains very insufficient and poorly diversified, which testifies to the pedagogical approaches used in these structures. When a school does not have the essential equipment and infrastructure for students, it simply means that education is confined within four walls.

Research question 3: How do teachers see the educational experiences influencing the employment and career opportunities of the graduates of TVET programs in agriculture?

Effectiveness of the student training program

The findings elucidated the ability to gain work skills through the CBA program. All participants agree about the opportunities that this program provides to students, teachers, and administrators. At the participants' level, they have been given a well-defined benchmark, and they thought it could be interesting in terms of the labor market. That is to say that the repository meets the standards of the labor market. The program helps students find work easily while strengthening the acquisition of transversal skills. Ngouye illustrated this situation by saying that "Le programme a permis de mettre en place tant bien que mal dans les écoles de formation agricole des dispositifs de traitement des difficultés des élèves afin de faciliter l'atteinte des objectifs de l'enseignement. Par exemple, nous apportons aussi des solutions plus simples pour aider les élèves à mieux communiquer entre eux et en milieu professionnel." Meaning that "The program has made it possible to set up, as best they can in agricultural training schools, systems for dealing with student difficulties to facilitate the achievement of educational objectives. For example, we are also providing simpler solutions to help students communicate better and in the workplace."

The program improves student learning; if the right level of resources is met, it leads to better learning outcomes. On the student side, teachers find that the training and processes implemented for the acquisition of skills promote learning despite the content differences from one school to another. The program provides the skills necessary to conduct self-regulated activities by the students, which gives them autonomy resulting from their learning outcomes.

The results of the study showed different abilities to measure the effectiveness of the training program. Indeed, there are several types of evaluation. The participants explained that there is a classic written assessment on the exam. Sometimes teachers made them more practical work such as monitoring crops, producing monitoring reports or topics on which they will do research, and produce a report that will serve as an evaluation. Also, they have a panoply of types or assessment systems that allow them to see and appreciate the theoretical, practical. These assessment methods make it possible to assess the skills and competencies acquired by students during their CBA training. Besides, interviewees considered modifying the course content evaluation to improve student learning despite the poor working conditions in the ATVET system.

Darou continued in the same vein to clarify assessments at the start of each lesson or class. He told that

“Nous avons des évaluations à faire chaque cours et jour pour apprécier les résultats et pour savoir si les élèves ont compris le cours avant de quitter la salle de classe. Nous devons faire toujours une révision et une évaluation à la fin du cours. Ces évaluations ne concernent pas votre matière à enseigner car il est parfois nécessaire d’apprécier une compétence antérieure si elle est bien maîtrisée par les élèves avant de continuer à faire ton cours. Ainsi, si cette compétences n’est pas installé il sera très difficile pour l’enseignant de dérouler son cours en vue d’installer une nouvelle compétence. En plus de cela, les élèves ne comprendront pas votre cours et la compétence à installer. Il est nécessaire de comprendre la compétence précédente avant de continuer avant de progresser sur le suivant.”

Signifying that “We have assessments to do at the start of each lesson and on specific days to assess the results and see if students have understood the task before leaving the classroom. We always have to do a review and evaluation at the end of the course. These assessments do not concern your subject to be taught because it is sometimes necessary to assess a previous skill if the students master it well before continuing to teach your course. Thus, if this skill is not installed, it won't be straightforward for the teacher to unfold his course in order to establish a new skill. On top of that, students will not understand your course and the competencies to be installed. It is necessary to understand the previous competencies before progressing to the next one”

Moreover, Boy Peul explained another fundamental fact: the competency-based program did not envisage a national certification exam but rather for school-level certification after students have acquired all competencies. He said that

“A la fin de l’élaboration du programme provisoire et sa mise en œuvre, le bureau des examens a refusé la certification au niveau des écoles mais plutôt au niveau national avec l’organisation d’un examen final de certification.” Translated to “At the end of the development of the draft program and its implementation, the office examinations refused certification at the school level but at the national level with a final certification exam.”

Mary emphasized that “Il y’a un paradoxe dans la mesure où les élèves sont certifiés par des enseignants qui ne les ont pas donnés ces compétences. Je pense que ce programme est juste un moyen de capter le financement des bailleurs de fonds.” Meaning that “There is a paradox in that students are certified by teachers who have not given them these skills. I think this program is just a way to capture funding from donors.”

In sum, The CBA program provides possible to set up best practices in agricultural training schools. Also, it requires the development of new assessment methods that met all training strategies for possible skills and competencies. It offers the possibility to modify the course content to improve student learning despite the poor working conditions.

Knowledge and skill Applications in the fields

The results show the need for highly qualified human resources in the labor markets. Overall, the program responds well to the needs of the labor market and the various agricultural and livestock sectors. The program developed a lot of skills that can facilitate their integration into the professional environment. All of the agriculture and livestock practices are included in the training program to meet the needs of students and producers. In fact, ATVET school products are well known and sought after in the workplace. To illustrate

the results, Ngouye said tha “Le programme permet d’acquérir les compétences nécessaires pour trouver du travail dans le milieu agricole : Oui oui oui, Les compétences.” Explained to “The program provides the skills necessary to find work in the agricultural sector: Yes, yes, yes, Skills.”

The interviewees explained that the students have a better appreciation of the agricultural situation of their immediate environment and the country because they do some research that guides them to do case studies in certain situations of the farming system in general. Also, all teachers agreed that study trips and field trips allow students to discover the professional environment and the working conditions of the producers. These opportunities enabled them to gain knowledge and skills, have a better appreciation and a better idea of its agricultural situation. Max demonstrated this fact by telling that “Les stages durent 45 jours en milieu professionnel pour aider mieux comprendre le milieu professionnel et avoir de nouveaux contacts.” Defined as “The internships last 45 days in a professional environment to help better understand the professional environment and have new contacts.”

Participants of the study complained about postponing field trips or work place visits. Almany told that “Les voyages d’étude au moment de les réaliser, on dit qu’il n’y a pas de moyen ou de logistiques etc. et on est obligé de reporter jusqu’à une date ultérieure. Parfois même, ces activités ne sont pas effectuées ou se déroulent correctement.” Explained as “Field trips when it comes time to make them, we say that there is no means or logistics etc. and we are forced to postpone until a later date. Sometimes even these activities are not carried out or go well.”

Internship management is quite simple in schools with industry leaders supported by the administration. Ouse exemplified the process by indicating that

“Pour les stages professionnels, c’est le responsable de filières qui gère les stages. En premier, je demande les élèves s’ils ont des préférences pour faire leur stage

professionnel. Je leur demande s'ils connaissent un endroit pour le faire ou quelqu'un qui peut les accueillir pour le stage. Parfois les collègues aussi nous trouvent des stages sous la supervision du responsable de filières. Il faut noter que je suis le responsable de la filière agriculture et l'élevage. Une fois que le lieu de stages est identifié le responsable de filières et l'administration fassent le nécessaire surtout sur le plan administratif pour faciliter les stages. Nous gardons la base de données pour faciliter les futurs élèves à trouver un stage."

Meaning that "For professional internships, it is the branch manager who handles the internships. First, I ask the students if they have any preferences for their work placement. I ask them if they know of a place to do it or someone who can accommodate them for the internship. Sometimes colleagues also find us internships under the supervision of the person in charge of the branches. Also, I am responsible for the agriculture and livestock section. Once the place of wise men is identified, the person in charge of the sectors and the administration do what is necessary, especially at the administrative level, to facilitate the internships. We keep the database to enable future students to find an internship."

The results show the existence of an office responsible for employing students after they leave. The insertion cell is a state structure that is part of the access to skills program to support young people and facilitate their employment. It also enables internship requests after student certification. Thereby, Yoro explained the opportunities in getting employment in the private and public sectors. He said that

"A leur sortie, ils ont deux possibilités à savoir l'auto emploi et l'emploi salarié. Si c'est l'auto emploi, ils sont responsables de recherche de financement avec l'appui de la cellule à l'insertion qui est au niveau de l'école. La cellule à l'insertion accompagne les diplômés à chercher des finances en facilitant le contact ou le remplissage des formulaires de demande et d'appui au financement. Quand il s'agit des emplois salariés, ils guident les élèves dans leurs démarches administratives parce que le plus souvent dans le domaine agriculture et de l'élevage il n'est pas difficile de trouver du travail. Egalement, la cellule donne conseils pour encourager les élèves à l'auto emploi."

Defined as "When they leave, they have two options, namely self-employment and private or public employment. If it is self-employment, they are responsible for fundraising with the support of the integration unit, which is at the school level. The integration unit supports graduates seeking finance by facilitating contact or filling in application and funding support forms. When it comes to salaried jobs, they guide the students in their administrative procedures because it is not difficult to find work in agriculture and animal husbandry. Also, the cell advises encouraging students to self-employment."

Although the program is pretty sustained for the level of the students, the participants thought that ATVET schools have a good level of recruitment in the professional environment of students who have their degree. Diarra expressed that

“Je pense que le niveau de recrutement des élèves est moyen et parfois on nous demande des élèves avant même qu’ils terminent les études. Les élèves de la filière élevage sont recrutés par les vétérinaires comme aide, les fermes et dans les industries agroalimentaires. Cependant, il faut noter qu’il est difficile de devenir agent de l’État ou fonctionnaire. En dehors de l’insertion de l’agriculture, de l’élevage et de la santé communautaire les autres filières trouve difficilement un emploi. Il faut noter que les métiers de teinture et de couture sont plus facile a créé une entreprise sans problème et de faire de l’auto emploi parce que elle ne demande pas beaucoup de moyens.”

Meaning that “I think the level of student recruitment is average and sometimes we are asked for students before they even finish school. Veterinarians recruit students in the livestock sector as helpers, farms, and in the food industry. However, it is difficult to become a state agent or civil servant. Apart from integrating agriculture, breeding, and community health, other sectors have difficulty finding employment. Note that trades dyeing and sewing are easier to set up a business without a problem and make self-employment because it does not require a lot of money.”

However, Nguabou thought that the insertion is much more complicated now. He added that “Depuis deux ans, les étudiants sortants et diplômés parviennent à trouver un emploi de plus en plus difficile parce que leurs nombres ont augmenté. Au paravent, dans les trois premiers mois la moitié arrivait à trouver un emploi. D’après le retour que nous recevons des étudiantes sortantes et diplômés bien qu’il n’y a pas encore une autre étude sur le niveau d’emploi, la situation est difficile pour certains entre eux. ” Translated to “For the past two years, outgoing and graduate students have been able to find increasingly difficult jobs because their numbers have increased. Previously, in the first three months, half of them managed to find a job. Based on the feedback we are receiving from graduating and graduating students, although there is not yet another study on the level of employment, the situation is difficult for some of them.”

Max amplified the alumni insertion in the job market. He claimed that “Il y’a certains étudiants qui sont sortis depuis deux ans mais qui n’ont pas pu s’insérer et ceux de l’année passée il y’a certains qui sont dans la même situation. Tout ceci dépend de la condition de vie, des diplômés. On a de plus en plus de filles qui fréquentent l’école et elles se marient étant étudiantes et très souvent elles ont un enfant avant leur sortie ou tout juste après leur sortie.

En général, quand ça se passe comme ça, elle se concentre plus de leur famille au lieu de chercher du travail. Cette situation s'accroît et c'est plus difficile pour ces filles que pour les garçons" Interpreted as "Some students have dropped out for two years, but they have not been able to get a job position, and those of the past year, some are in the same situation. All this depends on the condition of life, on the graduates. All this depends on the condition of life, on the graduates. We have more and more girls going to school, and they get married as students and often have a child before they leave or just after they leave. Usually, when it goes like this, she focuses more on their family instead of looking for work. This situation is worsening, and it is more difficult for these girls than for the boys."

Furthermore, Niokhor added another example to show the complex situation that graduate students have in integrating the professional world. He said that

"C'est très difficile de trouver du travail. Aujourd'hui on rencontre beaucoup d'élèves qui sont des conducteurs de Jakarta parce que tout simplement il ne trouve pas du travail. Nous avons du mal à sensibiliser les élèves pour prendre conscience de leur diplôme et des possibilités qu'ils ont pour trouver un autre emploi mais ils sont toujours là à chercher du travail ou un emploi salarié. En plus de cela, ils refusent de faire des prêts au niveau des banques parce que les conditions de paiement sont très difficiles. Ça aussi complique la situation et ne facilite pas l'insertion professionnelle des élèves. On explique toujours que le diplôme de CAP n'est pas fait pour être employé par l'État. Il faut le plus important de les pousser à créer des entreprises personnelles, avoir leur propre emploi ou bien travailler dans le secteur privé. Vous savez, il est très facile de créer un emploi dans le domaine de l'agriculture et de l'élevage. C'est pourquoi nous encourageons les élèves à créer leur ferme, jardin ou potager. Ce que nous aurons suggéré à l'état c'est de faciliter le financement des élèves provenant du système de formation professionnelle ou bien de créer des programmes spécifiques pour faciliter leur insertion."

Signifying that, "It is very difficult to find work. Today you meet many students who are drivers from Jakarta simply because they can't find a job. We find it difficult to educate students to become aware of their diplomas and the possibilities they have to find another job, but they are always there looking for work or paid employment. In addition to this, they refuse to make loans in banks because payment terms are very difficult. It also complicates the situation and does not facilitate the professional integration of the students. It is always explained that the CAP diploma is not made to be employed by the state. The most important thing is to get them to start personal businesses, have their own jobs, or work in the private sector. You know, it is effortless to create a job in the field of agriculture and ranching. This is why we encourage students to develop their farm, garden, or vegetable patch. We have suggested that the state facilitate the funding of

students from the vocational training system or create specific programs to promote their integration.”

This CBA program is one approach to solving the problem of skills mismatch. Also, it combines formal vocational education and training based on the workplace, like training with an employer. This system helps young people to make the transition from the TVET system to the professional world and workforces more quickly. However, there are problems in implementing the program because of its rigidities imposed and the lack of financial means, the obsolescence of equipment, and obsolete infrastructure in Senegal.

Research question 4: How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?

Planning and managing activities and times, and other resources to achieve teaching and learning goals

The findings demonstrated the need to improve the workforce needs teaching and learning. Indeed, all participants have the same view in transforming the educational system. They focused their thought on designing evaluation and monitoring instruments and indicators that addressed these needs. Hence, this new program has determined almost all of the educational courses. The evaluation should be shifted from the old program guides to the latest recommended tools using material and equipment related to the CBA program. Besides, Nguabou explained that the program defines the modalities and the process for evaluating the skills acquired by students.

Moreover, Nguabou added that the program is well developed, but the material necessary for the proper conduct of learning does not follow for an appreciation of the skills acquired by the students. Therefore, we need to have classrooms for activities in the implementation of the instructions and the evaluations because our leading problem, as a

teacher, is the lack of capacity building on assessment techniques in this new approach to skills. Better yet, even the organization of the room, types of equipment, and teaching methods are defined by the program, and we have not received any capacity building that would benefit our class.

Mary referred to the assessment needs to improve competencies. She argued that “. Il faut noter qu'il existe un seuil de réussite qui indique l'élève maîtrise la compétence. Si l'élève réussit à atteindre le seuil, on conclut qu'il a acquis la compétence pour cet objectif spécifique ou bien pour le module. Il faut noter que le programme requiert que tous les élèves réussissent en maîtrisant les toutes compétences dans nos conditions de travail. En d'autres termes, il faut que 100 % des élèves qui acquièrent les compétences du module et que tous les étudiants passent aux examens.” Described as “It should be noted that there is a pass threshold that indicates the student has mastered the skill. If the student succeeds in getting the points, it is concluded that he has acquired the competence for this specific objective or the module. It should be noted that the program requires that all students succeed by mastering all the skills in our working conditions. In other words, it should be noted that the program requires that all students succeed by mastering all the competencies in our working conditions.”

Yoro clarified the importance of evaluating competencies to fit workforce needs. He indicated that “On fait des évaluations d'intégration c'est-à-dire si les éléments de compétences ou les objectifs spécifiques évalués sont cumulés. On prend les notes déjà évalué pour les intégrer dans le pourcentage réservé pour chaque compétence. Chaque note correspond à un pourcentage qui va donner la note finale pour voir si l'élève a atteint le seuil de réussite ou non. Pour les élèves qui ne parviennent pas à atteindre le seuil de réussite, il va faire une remédiation. Ainsi, il va faire une révision sous la supervision de l'enseignant et reprendre les évaluations.” Translated to “Integration assessments are carried out; that is to

say, the elements of skills or the specific objectives assessed are cumulated. We take the notes already assessed to integrate them into the percentage reserved for each skill. Each mark corresponds to a percentage that will give the final grade to see if the student has reached the threshold of success or not. For those students who fail to reach the pass threshold, he will do some remediation. Thus, he will do a review under the supervision of the teacher and resume the assessments.”

Furthermore, Ouse recalled the program goal of having 100% of students succeed by mastering all the competencies. He talked about the requirement for remediation, which helped to get a 100% student success rate. Also, he explained the implementation of the remediation going. He illustrated this fact by saying

“Cette remédiation ou rattrapage sous la supervision de l’enseignant est à la fois par écrit en classe et sur le plan pratique. Il faut noter que l’examen se fait sur le plan pratique c’est-à-dire la certification. A l’examen les élèves sont le plus souvent appelés à faire de la théorie uniquement si les moyens nécessaires pour faire la pratique n’existent pas. Dans ce cas, l’enseignant propose à l’élève un sujet qui traite les aspects de l’examen pratique. Ainsi si l’élève parvient à décrire correctement le procédé de la pratique on considère qu’il a la compétence, cependant s’il ne réussit pas à décrire encore correctement le procédé donc il est considéré qu’il n’a pas la compétence. C’est pourquoi le plus souvent on trouve des élèves de la même classe qui ne font pas le même examen de certification ou bien qui ont des matières qui varient durant la certification. Il faut prendre en compte que l’assiduité de l’élève ainsi que son comportement en classe et pris en compte aussi dans la note finale de l’élève.”

Interpreted as “This remedial or remedial action under the supervision of the teacher is both written in class and practice. It should be noted that the exam is done on a practical level, that is to say, the certification. Students are most often called upon to do theory in the exam only if the means necessary to do the practice do not exist. In this case, the teacher offers the student a subject that deals with aspects of the practical exam. Thus, if the pupil manages to describe the practice correctly, it is considered that he has the competence; however, if he fails in still correctly describing the process, it is assumed that he does not have the competence. This is why we often find students in the same class who do not take the same certification exam or who have subjects that vary during the certification. I must take into account students' attendance and their behavior in class and take into account the final mark of the student.”

Furthermore, all interviews agreed about the continuous necessity to improve TVET programs for the industry-transforming realities. They indicated that the program is currently

very rarely revised to adapt it to the market's needs because it requires many resources. It has to be evaluated in order to be able to update it because the authorities do not have the necessary means to frequently hence programs. Nevertheless, the teachers introduced remarkable innovations concerning the courses to answer the requirements and correct the insufficiencies of the market better. Niokhor explained his experience in improving lessons.

He said that

“J’insère quelques séquences des actualités pour s’adapter à de nouveaux contextes pour mieux répondre aux besoins des étudiants. Heureusement pour nous qui sont dans la formation professionnelle, les bailleurs ont appuyé les autorités académiques pour mettre en place ce nouveau programme. En effet, pour répondre aux besoins du monde de travail, il faut une prise en compte de plusieurs facteurs. Comme je l’ai dit tantôt il faut d’abord une évaluation en relation avec cette nouvelle demande en allant sur le terrain pour faire des enquêtes, rencontrer les professionnels et s’enquérir de leur besoins. Il faut y intégrer les anciens diplômés de l’école dans leurs milieux professionnels pour mieux comprendre les mutations dans le monde du travail. Par ailleurs, il faut des études de satisfaction pour pouvoir évaluer les programmes de formation agricole. Et ceci tant qu’elle n’est pas faite on ne peut pas répondre aux besoins du marché. La conséquence est qu’elle crée un léger décalage entre le programme et les besoins du marché.”

Indicating that, “I insert some news sequences to adapt to new contexts to meet the needs of students better. Fortunately for us in vocational training, the donors have supported the academic authorities to set up this new program. Indeed, to meet the needs of the working world, several factors must be taken into account. As I said earlier, we first need an assessment about this new demand by going into the field to make inquiries, meet with professionals and inquire about their needs. It is necessarily better to integrate the school's alumni into their professional backgrounds to understand the changes in the world of work. Also, satisfaction studies are needed to be able to evaluate agricultural training programs. And this until it is done we cannot meet the needs of the market. The consequence is that it creates a slight mismatch between the program and the needs of the market.”

The case study participants believe that addressing workforce needs through teaching and learning strategies requires the modernization of the class environments according to training and technological developments in the Technical and Vocational Education Program in Senegal. Thereby, Darou talked about the needs for educational materials such as projectors, course manuals, administration supports, offices, printers, etc. To this must also be added the need to reconsider transversal courses in the program. These cross-cutting classes

are not taken into account in the technical and practical environment, but they are vital to the students' success. He added that “ Il y’a aussi les formations de renforcement de capacité sur les nouvelles technologies. Dans notre situation actuelle de formation, c’est comme si nous ne sommes pas dans le système APC car il n’y a pas de changement dans le déroulement des matières transversales. Il n’y a pas de changement du fait de leur élimination dans l’examen de certification. Sur le plan pédagogique, oui ... oui, au-delà des problèmes d’infrastructures classiques. Nous avons toujours besoin d’améliorer l’environnement technique, types niveau d’équipement, etc.” translated to “There is also capacity-building training on new technologies. Our current training situation is as if we are not in the CBA program because there is no change in transversal courses. There is no change due to their removal from the certification exam. Pedagogically, yes, ... yes, beyond the classic infrastructure problems. We always need to improve the technical environment, types of equipment level, etc.”

All participants regretted the deterioration of the school’s living and working conditions for the students in agricultural schools. The various resources such as human, material, financial and organizational mobilized are insufficient and inadequate concerning the requirements and expectations of this sector of agricultural education. In addition, the lack of support for the infrastructure and necessary equipment in the operating budget clearly shows the inadequacies in the coherent planning of the quality of training for young people. They thought that for an improvement of the technical environment, the academic authorities must pay special attention to the sustainability of the infrastructure, the optimal learning environment and the ease of maintenance, and a new model of administrative management.

State and school authorities’ consideration and funding

The participants claimed that funding for vocational training is lacking because the government has cut the budget for vocational schools. Today, the ministry allocates an

insufficient budget to vocational schools; in compensation, the school heads have been ordered to generate additional financial resources to complete the budget deficit. Indeed, vocational schools are assigned to create revenue that will allow them to function correctly. In this study, the teachers were very disappointed in the behaviors of the directors of these establishments concerning dispatching the budget for the different schools' sections. They complained about it by sharing experiences that are not shining for their position. They said that the biggest challenge that the agricultural schools have today concerning the budget is the lack of consideration that the directors of these establishments have for the financial needs of the agriculture programs.

The participants believe that the government tends to neglect the agricultural sector under the pretext that the livestock and livestock sectors' demands are onerous to be supported by the budget. Also, they refuse to give or make a fair budget arbitrage. The agricultural sector is most often neglected, so we lack the material and equipment necessary to do our practical work. Diarra gave an example, telling that “si un directeur et de la filière restauration l'essentiel du budget est mise dans la filière restauration au détriment des autres filières et plus grave encore pour l'agriculture” indicating that suppose a director is from the restoration sector. In that case, the most investment is put into this sector to the detriment of other sectors and more serious for agriculture. The Heads of TVET schools often forget that agriculture and animal husbandry can generate income to cover all school needs. Today our big fight is to make sure that we have a budget that allows us to do a good production and to try to achieve our financial self-sufficiency.

In sum, the big challenge for the administration of these schools is to fight to have a production farm with sufficient water that will allow the school to do the production. This situation is the result of a school administration that is not ambitious enough to develop the

agricultural sector. In addition, it fails to create partnerships with industries in the area or projects to allow the development of this sector. We have a chronic budget deficit and an administration that does not facilitate the development of agriculture. Therefore, the ATVET schools need immense supports on all fronts to meet the challenge of improving training programs.

Professional development of teachers

Profession development activities for teachers to address the workforce demands through teaching and learning strategies are imperative to enhance the students' learning processes. Indeed, the results showed that teachers' training and pedagogical follow-up is a significant area of concern. The researchers analyzed the need to improve the teaching skills because it is essential to do capacity building. These training sessions will help perfect the teaching methods and better train the students because no teachers have the necessary knowledge for all teaching techniques. However, Yoro criticized the little capacity building there is for teachers. He mentioned that

“Un autre problème que je pense être intéressant de souligner, c’est la formation diplômante des enseignants. Nous avons des renforcements de capacité qui sont plutôt techniques que pédagogiques car cette formation ne nous donne pas les bases pédagogiques avec les techniques, les approches, les méthodes et les pratiques pédagogiques que nous sommes sensées utilisés en classe.”

Meaning that, “Another problem that I think is interesting to point out is the diploma training of teachers. We have a more technical capacity-building than pedagogical. This training opportunity does not give us the pedagogical bases with the techniques, approaches, methods, and pedagogical practices we are supposed to use.”

In the same vein, Ngouye pointed out a limit of the professional development program for teachers. She said that “ Nous sommes formés sur les techniques culturales en maraichage, la délimitation d’une planche, les engrais utilisés, les pathologies végétales etc... alors que nous avons besoin des techniques spécifiques pour animer une classe, de bien communiquer en classe, de faire participer les élèves, de contrôler les élèves, de préparer ces fiches de cours

etc... cette formation en ce qui me concerne ne m'a pas servi sur le plan pédagogique. J'ai été plutôt renforcée sur le plan technique et non pédagogique car je n'ai reçu que les aspects techniques en agriculture que je savais déjà depuis ma formation technique initiale. ”

Resumed to “We are trained in market gardening techniques, the delimitation of a plank, the fertilizers used, plant pathologies, etc... While we need specific techniques to lead a class, communicate well in class, involve the students, control the students, prepare these lesson sheets, etc.... this training, as far as I am concerned, has not served me pedagogically. I was rather strengthened on a technical and non-educational level because I only received the technical aspects in agriculture that I already knew from my initial technical training. I was rather strengthened technically and not teaching pedagogy because I only received the technical elements in agriculture that I already knew from my initial technical training.”

And Niokhor added that « Je suis très déçue de cette formation qui a duré 2 mois parce que je n'ai bénéficié d'aucune avancé sur le plan pédagogique que je pouvais utiliser en classe avec mes élèves ou de l'exercer dans la salle de classe. Je peux dire que c'est le développement et formation personnel seulement qui peut aider améliorer ta pédagogie dans nos conditions actuelles de travail.” translated to “I am very disappointed with this training, which lasted two months, because I did not have any educational advancement that I could use in class with my students or practice it in the classroom. I believe that it is only personal development and training that can help improve your pedagogy in our current working conditions.”

In sum, in the current working conditions, it is impossible to meet the training objectives. Teachers have the repository manual, but it does not help them in their capacity-building goals. They urgently needed educational logistics to support their teaching activities and compensate for the lack of capacity building. Today, it is difficult to say that teachers are

achieving the programs' goals in terms of skills and competencies because they have very few teaching techniques. The worst in this situation is that some TEVT school directors do everything to hide the reality that teachers and students face. All participants believe that they should spend some time to assume their working conditions better and accept that it is very difficult to succeed in the mission with the available means.

Additionally, other elements emerged from the findings, such as the choice of course content and the lack of inspection in the educational activities. The results illustrated the need for academic inspectors to train, supervise and guide teachers in the classroom. Indeed, the first challenge revealed is lesson content. The big problem is the choice of course content because participants have not yet received the necessary training and capacity-building that allows them to assess the chosen course content to meet the program's objectives about the skills and specific objectives of the course. Thus, they based and guided themselves on their experience, their practices in the old system, and their advice of colleagues. The main problem with this system is meeting training objectives by making wise choices about the course content. Taking better account of these difficulties would help answer the demands for quality vocational education and the local job markets.

To elucidate these working conditions, Boy Peul talked about problems that he and his colleagues are experiencing: the lack of inspection in our educational activities with specialty inspectors. He claimed that

“ Moi qui suis dans le domaine de l'élevage, on m'envoie un inspecteur en comptabilité pour évaluer mes fiches de cours en élevage, mes pratiques pédagogiques et l'environnement de la classe. Je ne comprends pas qu'est-ce qu'un tel inspecteur peut m'apporter pour l'amélioration de cours en élevage. Les inspecteurs viennent nous contrôler sur nos compétences à dérouler le nouveau programme avec l'approche par les compétences alors que beaucoup d'enseignants n'ont pas encore fait leur renforcement de capacité par rapport aux compétences liées à l'agriculture et l'élevage. Ces inspecteurs ne peuvent rien nous apporter sur le plan technique pour améliorer nos pratiques pédagogiques. Ce qui intéresse ce genre d'inspecteur est de voir si je suis le canevas

indiqué par le programme et non si le contenu est superficiel. Ils pensent que j'ai fait un bon travail en basant ces éléments. Malgré qu'ils savent que nous n'avons pas reçu la formation nécessaire conduire notre classe avec cette approche, ils nous inspectaient. Par ailleurs, les équipes d'enseignants pose un autre regard sur leurs pratiques et à mesurer à la fois les points forts, les réussites et les aménagements à apporter pour faciliter la réussite de leur inspection. Nous pensons tous que cette démarche ne peut se réaliser pleinement que dans une dynamique collective et de renforcement la continuité et la cohérence des pratiques au sein d'un même établissement. Cela permet à chaque enseignant de reconnaître le travail effectué pour réussir sa mission de formation."

Expressed as "I am in the field of animal husbandry, and I am sent an accounting inspector to assess my course sheets in breeding, my teaching practices, and the classroom environment. I do not understand what such an inspector can do for me for the improvement of breeding courses. The inspectors come to check us on our skills to roll out the new program with the skills-based approach, while many teachers have not yet done their capacity building in skills related to agriculture and livestock. These inspectors cannot give us anything technically to improve our teaching practices. What interests this kind of inspector is to see if I am following the canvas indicated by the program and not if the content is superficial. They think I did an excellent job basing on these things. Despite knowing that we were not trained to conduct our class with this approach, they inspected us. In addition, the teaching teams take a different look at their practices and measure both the strengths, successes, and arrangements to facilitate the success of their inspection. We all believe that this approach can only be fully realized through a collective dynamic and strengthening the continuity and consistency of practices within the same establishment. This allows each teacher to recognize the work carried out to succeed in his training mission."

All participants believe that academic inspectors play a key role in the education system. Thus, they need the inspectors in teaching techniques because before starting certain courses, they evaluate them in order to improve their teaching methods. The academic inspectors give them easy and better solutions to manage the classes, guides, and lexicons to grasp agriculture concepts better. These inspectors help teachers better animate the classroom and explain the course content to the students. They help all to supervise the students in their learning processes. Thus, they will have perfect harmony between the skills, the content, the program, and the used teaching technique.

In the goals to develop teachers' pedagogical competencies, participants said that they have created a pedagogical cell for teachers from the agriculture and livestock section to minimize these time management difficulties for the smooth running of the program. Indeed,

they agreed about the benefits of the cell in their teaching classes. Max recalled the objectives of the pedagogical organization to ameliorate their pedagogical practices. He said that “La cellule pédagogique nous permet de discuter nos difficultés pédagogiques. Cette cellule nous permet d’harmoniser les contenus bien vrais que nous rencontrons beaucoup de difficultés pour cette harmonisation des contenus à cause des référentiels de l’approche par les compétences, le manque moyens techniques et financiers. En effet, ils nous arrivent de demander de respecter le référentiel alors que d’autres collègues suggèrent d’adapter le référentiel en fonction du niveau des élèves et des matériels pédagogiques disponibles. Néanmoins, la cellule nous aide beaucoup dans le choix des techniques pédagogiques adaptées, du choix des contenus et le renforcement de nos capacités pédagogiques.”

Transcribed as “The pedagogical team allows us to discuss our educational problems. This teacher's team will enable us to harmonize the course contents; we encounter many difficulties and challenges for this harmonization of contents because of the reference frames of the approach by competencies, the lack of technical and financial means. Indeed, we sometimes ask to respect the referential guide while other colleagues suggest adapting the referential system according to the level of the students and the teaching materials available. Nevertheless, the pedagogical team helps us a lot in choosing suitable teaching techniques, the choice of content, and strengthening our teaching capacities.”

The findings revealed that it is important to improve and address workforce needs through teaching and learning strategies. All participants expressed their concerns in enhancing learning strategies and ATVET programs may start with the certification exam. Besides, they emphasized that the main problem with this program is the certification exam. Indeed, students cannot install a vegetable production during the three certification exam, have growth, and harvest them before the end of week exam. This management of the CBA

program poses a big problem. Thus, Nguabou expresses that “APC pose un grand problème, oui un grand problème pour la certification. Ils ont voulu changer de manière d'enseigner et d'apprendre avec un nouveau programme mais les autorités éducatives veulent toujours garder le contrôle de la délivrance des diplômes.” Translated to “CBA program poses a big problem, yes, a big problem for the certification. They wanted to change how they teach and learn with a new curriculum, but the education authorities still want to control the awarding process degrees.”

The interviewees added that the CBA program is an excellent tool to improve teaching and learning while obtaining the diploma without a final certification exam. Indeed, the designers of the program wanted to gradually obtain a diploma with a progressive assessment of competencies from the first to the third year to get his CBA certificate. Unfortunately, the academic authorities have finally decided to maintain the final certification, which takes place in 3 days, contrary to what was planned in this program. Besides, the certification system is a gap and deserves to be adapted to meet the demand for training and overcome the courses' obsolete nature.

The certification system can help create a quality assurance system. Indeed, developing a solid quality assurance system can ensure accountability and establish processes to produce quality training that benefits students, employers, training organizations, and teachers, communities by improving the transparency and legitimacy of the ATVET system. Applying quality assurance standards will ensure the relevance and reliability of training programs. This change in the issuance of diplomas might boost the offers of technical training and technicians in areas with high demand for agricultural labor. Therefore, this mechanism will enable the setting of standards, the assessment of quality indicators, compliance with standards, and the processes of providing training and accreditation services.

Future of ATVET, its functions, and goals

The results displayed the need for improving the infrastructures and technical support. The teachers continued to not have the material and equipment means to succeed in educational activities. In short, there is an urgent need to strengthen the materials and equipment in these agricultural vocational training schools. Thereby, Nguabou qualified the program to be just the old program labeled differently. He said this new program is just the old program (goal-oriented approach) with a new name called the competency-based approach for the final exam to illustrate the infrastructure and equipment demands. Finally, they advocated that this agricultural training system requires resources to finance essential elements for quality education, such as work equipment, training and internship travel, and equipment and infrastructure maintenance. Consequently, the lack of infrastructure support and necessary equipment in the operating budget indicates a shortage of coherent planning of the quality of training.

The study showed that the increase in students' access to TVETs has led to a rise in demand for infrastructure and educational inputs. This demand depends on the state and local communities struggling to satisfy the deficit, which has repercussions on the quality of learning. Indeed, Yoro expressed that teachers are experiencing a glaring lack of tools suitable for market gardening. It is essential to note that teachers have some small equipment such as rakes and shovels. He also added that small gardening equipment is not available in certain schools far from urban centers such as the department of Bambey. Max completed by saying that we have to go to the capital regions to have some practical work materials or some seeds for gardening. Therefore, students often wait during periods of study trips or field trips to discover seeds and gardening equipment. Diarra indicated that “pour pallier à cette difficile situation, les autorités recommandent à l'administration des écoles de trouver des moyens

financiers pour acheter le petit matériel pour faciliter l'apprentissage des élèves afin de faire les activités pratiques pour l'acquisition des compétences... C'est au niveau des stages que les élèves découvrent le plus souvent le matériel nécessaire pour la formation agricole et de l'élevage." Meaning that, "The authorities recommend the school's administration to find financial means to overcome this situation by buying small equipment to facilitate the students' learning to do the activities to acquire skills. It is through the internship that students most often discover the material needed for training. This point is a handicap for the smooth running of this program for agricultural and livestock courses."

The authorities should spend the necessary resources in agricultural technical vocational education to develop technical expertise to create, operate and maintain equipment and infrastructure, and design the process of growth and agro-industrial change. The findings clarified the insufficiency of investment in the training of teachers. Indeed, achieving good returns on investments in ATVET requires adequate funding and efficiency in the use of training resources because ATVET is much more expensive to deliver than general education. Boy Peul advocated that currently, teachers and school administrators are in a phase of financial empowerment of training schools because the state authority has decided that the trades must be financially independent despite the budget subsidy. Niokhor claimed that " Il faut noter que les budgets sont insuffisants car le budget total venant de l'état ne peut pas satisfaire les besoins de la filière élevage juste pour montrer l'insuffisance du budget de l'école," translated to "We know that the budgets are insufficient because the total budget coming from the state cannot meet the livestock sector's needs to show the school's inadequate funding." This working condition is why it is difficult to run the program normally. He emphasized that if it were not for project support and training offers for producers, we could

not properly carry out our teaching activities in agriculture. Moreover, the participants explained that we have the possibility of having this financial autonomy.

Finally, the agricultural EFPT should be reformed, refocus its missions, and modernize its tools to satisfy the training requirements of youth, students, and farming businesses. The authorities and partners must strengthen the TVET schools and its scope broadened so that it can reach other layers of society with training needs. The increased budgetary means could improve training opportunities for employment and the competitiveness of students to modernize, increase efficiency and competence. Also, resources must meet professional requirements for enterprises that operate as formal enterprises or as informal enterprises. In addition, more informed funding should potentially support agricultural vocational schools to empower them.

Chapter 5: Discussion and Recommendation

This research study examined the “Development of Agriculture value chains as an asset for the sustainable development and food security: the case of the improvement of agricultural technical and vocational education in Senegal.” The purpose of this case inquiry is to check and determine the needs to improve agriculture technical and vocational education programs in Senegal by focusing on pedagogical aspects and teaching strategies to address the new growing competency demands of the different value chains within the agriculture system. This chapter exhibits the findings to discuss the research questions below:

1. What teaching activities do instructors utilize in the Technical and Vocational Education Program in Senegal?
2. How do teachers describe the learning experiences of the graduates of TVET programs in agriculture?

3. How do teachers see the educational experiences influencing the employment and career opportunities of the graduates of TVET programs in agriculture?
4. How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?

Four research questions to understand teacher's thoughts on improving the ATVET system. The researchers used the classified themes to discuss the findings from four questions to clarify the imperfect TVET teaching and learning strategies. For this case study, researchers implemented data collections from interviews.

Discussion

Research question 1: What teaching activities do instructors utilize in the Technical and Vocational Education Program in Senegal?

Organization, management, and teaching methods

The results showed that the participants are well experienced and knowledgeable of the common efficient employment of insufficient pedagogical supplies in class for the CBA program. The variety of positions, years of professional experience, and academic levels constitute an excellent opportunity for changing learning processes and the environment. Indeed, the quality of TVET teachers constitutes a fundamental factor for creative teacher education methods and innovations at institutions with the CBA program. The results align with Ramadan, Chen, & Hudson's (2018) findings to enrich their students' classroom experience with new knowledge and develop their skills and problem-solving skills. Also, the pedagogical implications of integrating the competency-based (CBA) program in the ATVET system may be beneficial if the reform concentrates on the expertise of teachers and school managers as agents of change to access new levels of learning and quality of outcomes that take into account the changing nature of agricultural education. Besides, teachers' and administrators' practical knowledge and skills connect with the agriculture value chains as an asset for sustainable development and food security. Indeed, the connection with the agriculture value chains corroborates with Lowitt et al. (2015), stating that "... forms of knowledge generation and sharing—available as a potential resource for the value chain" (p. 371). This result comforts the idea about the knowledge and experience in agriculture because teachers' knowledge and experience in the agriculture subject they teach and their quality have a measurable impact on student performance in implementing their skills.

In addition, the results revealed challenges of teaching four agriculture competencies and six essential breeding skills with their implication of the implementation. As mentioned by Ouse "Il y'a trop de cours qui se répètent (anatomie des volailles en trois cours), ce qui prend plus de la moitié des heures de cours." translated to "There are also three poultry farming modules (meat, free-range chicken, egg)." There are too many repeating lessons (poultry anatomy in three lessons), which takes more than half of the lesson hours with the theory," exposes well that this vast program can lead to an overload of professional work. Indeed, the work overload execution prolonged the teacher's schedule with a mix between professional and private life due to an absence of a clear delineation between them. This situation may encourage teachers to leave their teaching position (Tafida, Clement, & Raihan, 2015). Moreover, the training program's content with the competency-based approach (CBA) is very broad, but it may help the learners be trained in both career and technical and vocational education. Students enrolled in this CBA program have sufficient opportunities to master relevant technical skills within the six essential breeding skills (meat production, short bass, broilers, table eggs, draft animals, and milk) or four horticulture competencies (production of plans or nurseries, fruits and vegetables, and floriculture). The results exposed that the learners must fulfill skills and competencies in this CBA program to get their degrees (Oviawe et al., 2017; the Republic of Senegal, 2015).

The findings revealed the negative impact of challenges, such as organization, management, and delivery in implementing the CBA program. The mode of organization, management, and pilotage of the sector remains unsuitable despite the orientation of ATVET by the education authorities in Senegal. These difficulties seem to show that the mechanisms for harmonizing government TVET policy are not working in the best conditions to boost the reach of TVET. In addition, the planning, monitoring, and evaluation system appear

insufficient to improve the educational system. The powers transferred to local authorities in the area of vocational training are poorly implemented. The same is true for the capacities of devolved structures that are not operational in meeting the functional challenges of TVETs. As Yoro said in the findings to describe these challenges among the directors' behaviors by telling that “...le pire dans cette situation, il y’a certains directeurs qui font tout pour cacher la réalité que vivent les enseignants et les élèves dans les classes et sur le terrain.” Signifying that “...worst of all, some principals go out of their way to hide teachers' and students' classroom and field realities.” Therefore, the authorities must improve the quality of this training at the organizational level and a solid commitment to increasing teacher satisfaction for the students’ success. Indeed, a successful training institution can be better characterized by its degree of functioning as an efficient structure and its capacity to provide relevant training to companies and individuals.

The analysis of occupations made it possible to develop the TVET program and trained course guides relating to agricultural employment. The course guides make it possible to understand ideas concerning obligations, tasks, knowledge, skills, and, in some cases, practices that are part of the reality of the world of work and the agricultural enterprise (Chukwunwendu, 2015). In a modern labor market characterized by constant innovation, it requires more team-based learning than acquiring a wide range of technical and professional knowledge in theoretical and imitation courses (Chukwunwendu, 2015; Ismail & Mahammed, 2015). However, this program is synonymous with lectures, which are very far from the initial objectives. Niokhor's explanation proves the contradictory program implementation through these words, “...il faut un poulailler qui répond aux normes de productions alors que nous n’avons même pas un poulailler qui ressemble à celui des paysans.” Translated to “we need a henhouse that meets production standards when we do not even have a henhouse that looks

like that of the peasants.” In the same vein Ouse added that "Aujourd’hui, nous faisons le contraire du référentiel. Ceci pose un problème pour atteindre les objectifs du programme comme défini dans le référentiel des cours." Signifying, “Today we are doing the opposite of the benchmark or referential guide. Therefore, achieving the courses’ objectives of the program remained complicated to acquire the required skills and competencies successfully.

The researchers discovered that fundamental knowledge, pedagogy, and didactics are crucial for teachers to lead the classroom. The initial capacity-building for teachers is insufficient considering the various changes in the pedagogical approaches. Indeed, teaching methods need to focus on ATVET missions and modernize tools to meet the training needs of youth. The capacity building for teachers is training opportunities that improve teaching competencies and learning strategies for employment and competitiveness (Lamichhane, 2017). This situation reflected well Mary's assertion :

“...les enseignants sont sur le terrain avec toutes leurs difficultés pédagogiques mais ils ne reçoivent aucune formation sur ce plan pendant des années de services. Il nous faut des programmes de renforcement de capacité. D’ailleurs même, il est mentionné dans tous les programmes mais il n’est pas appliqué réellement alors que les enseignants ont besoin de nouveaux outils pédagogiques et des diplômes professionnels pour avancer dans leurs carrières.”

Interpreted to “...the teachers are in the field with their pedagogical difficulties, but they do not receive any training on this plan during years of service. We need capacity-building programs. Moreover, it is mentioned in all the program plans, but it is not really applied while teachers need new educational tools and professional diplomas to advance in their careers.”

Paryono (2015) described this paradoxical situation characterizing, Serumu (2015) and Omar et al., 2018. The program designed a capacity-building plan, which is also proving interesting for consolidating the pedagogical bases of teachers. It enables the development of high-quality academic, technical, and vocational training opportunities motivated by the specific skills objectives of the agricultural sector. This program is contradictory to Niokhor’s assertion about the current teaching strategies by saying “Les pratiques pédagogiques, ...c’est

des pratiques classiques. Elles n'ont pas encore évolué avec le nouveau programme.”

Transliterate to “Educational practices, ...are traditional practices. They have not yet changed with the new program.” Indeed, human capital development is an essential pillar of the growth strategy to raise the quality of training and the workforce considerably (Lilly & Efajemue, 2011). The lack of pedagogical and technical training for teachers is accompanied by the low accessibility of certain teaching tools and the lack of harmonization of teaching supplies. Also, it reflects the low appropriation and use of program guides as explained by Ouse: “Le plus souvent l’enseignant n’a qu’une ou deux séminaires de formation pédagogique pour toute sa carrière d’enseignant. C’est-à-dire sur une durée de 15 à 20 ans de carrière.” Signifying, “Most often, the teacher only has one or two teacher training seminars for his entire teaching career. That is to say, over 15 to 20 years of employment.” This lack of training reinforces the idea that many teachers do not have the pedagogical skills necessary to succeed in their mission in ATVET. The low level of equipment for certain agricultural activities leads to the difficulties encountered by the actors, both teachers and students. Therefore, the Teachers’ capacity building should be mandatory condition to achieve the objectives’ CBA program.

The results revealed various negative factors connected to the classroom processes and the different pedagogical methods applied in the scarcities of teaching environments. Classroom settings that are not contributory to learn to stay particularly detrimental to students who do not have additional resources to fulfill their education. As said by Yoro “Nos salles de classes ne répondent pas aux critères prévus par l’approche par les compétences. Nous avons des abris provisoires avec trois ou quatre élèves par table banc qui est très loin des standards pédagogiques ou le minimum qu’il faut pour réussir notre mission de formation dans ce programme.” Meaning that “We have temporary shelters with three or four students

per table bench, which is very far from the teaching standards or the minimum necessary to succeed in our training mission in this program.” Schools must ensure that the environmental conditions favor better knowledge, especially in agricultural establishments concentrating on many students. These results are similar to those obtained by Subedi & Shrestha (2020) and Lamichhane (2017), who explained teachers' difficulty implementing comprehensive education due to inadequate resources.

The transition from the skills-based approach to the skills-based process is still hardly noticeable in implementing learning with content. The syllabus and the school curricula only describe the learning objectives but not the course contents that the students will cover for each level and year of study and the total time devoted to teaching a given course skill. Teachers strive to cooperate by exchanging thoughts and lesson contents and support their students by showing interest in each of them, providing extra help, and allowing them to express their views—the assertion provided by Max exhibit this affirmation well. He explained his manner to select the course “Par exemple pour mon cours de biologie végétale, les objectifs ont été définis. Ainsi à partir de ces objectifs, je formule les objectifs spécifiques pour ce cours en utilisant mon syllabus pour choisir son contenu qui est modulable pour l’adapter aux contextes. ” signifying that For example, for my course in plant biology, the goals have been defined. So from these objectives, I formulate the specific purposes for this course by using my syllabus to choose its content which is flexible to adapt to the contexts.”

The objectives and contents of the lessons are generally taken from professional standards. Typically, they characterize the different levels of competence of agriculture with an essential contribution of the pupils. Students' participation in the choice of content to acquire the skills that correspond to the expected qualifications seems to optimize their learning. Thereby, Darou's statement documents these students' opportunities to contributing

to course content choices. He said “Cet échange avec les élèves peut amener à changer le volume des contenus en réorientant les parties du cours par rapport aux centres d’intérêt des étudiants. Malgré tout nous sommes tenus de respecter les objectifs du programme et ceux du cours.” Meaning “This exchange with students can lead to changing the volume of content by reorienting parts of the course concerning the students' interests. Despite everything, we are required to respect the objectives of the program and those of the course.” In sum, specific course objectives offer chances by using my syllabus to choose its content which is flexible content students' learning objectives.

The course content is the teacher's responsibility, while the CBA program is well designed to meet labor markets. This change of program accompanies new teaching objectives and training contents that need to be standardized to adapt to the current context of agricultural activity. In addition, achieving the goals of the CBA program may allow all students to achieve their learning goals differently (Constant et al., 2014). The teacher chooses the content according to the homogeneity of class and the student’s level of recruitment, the teaching techniques available to him, and the practical work material available (Mukhtar & Ahmed, 2015). The program is new, but the teaching material is obsolete, leaving the trainers with no other choice but to impart theoretical instruction generally. This situation poses the problem of selecting courses' content to be taught to achieve training objectives and skills. Almamy’s beliefs illustrate this teacher’s dilemma in choosing the contents. He said “...cette situation confuse sur les contenus montre bien les difficultés que les enseignants ont par rapport aux choix des contenus les cours. Il faut noter que le programme requiert beaucoup plus de pratique de théorie malheureusement les conditions ne nous permet pas de faire beaucoup de de pratique.” Signifying that “same program and the same content elements to facilitate the marking of the exams. This confusing

situation about content clearly shows the difficulties that teachers have about the choice of course content. This program requires a lot more practical work than theory; unfortunately, the conditions do not allow us to practice much.” Thus, each year the content of the same course may vary depending on many parameters. At this level, the teacher may have differences in content with other training schools because the levels of the students in the same class may differ.

Furthermore, the findings revealed that key aspects of classroom instruction, such as close monitoring, classroom pace and management, clarity of presentation, and course structuring, have positively impacted student success. They are the most visible facets of effective teaching (Badenhorst, & Radile, 2018; Marginson & Dang, 2016). The program is new, but the teaching material is obsolete, leaving the trainers with no other choice but to impart theoretical instruction generally. Besides, the results showed the challenges in choosing the content because of the teachers' pedagogical competencies. This situation poses the problem of the contents' choice to be taught in class, the achievement of the objectives, and the skills set out. Course contents may allow proper instructional guidance to lecturers and students' practices. However, lack of lecture contents may present insufficiencies in the class lecture capabilities for the learners. It appeared in the findings that substantial students' numbers with varied levels of academic willingness in the same classroom. Teachers offer class lectures that take into account various groups of students in the same classroom. Thus, these students have different educational levels, knowledge, and aspirations, making teachers' working conditions particularly difficult. This arguably may induce high disappointment for both teachers and students in implementing the CBA program (Badenhorst, & Radile, 2018). Therefore, it appears urgent to harmonize the contents by the authorities and those responsible for vocational training.

Financial means, school managements, environmental conditions, and relationship

The lack of financial means is a hindrance to the program's smooth operation and the working environment for the learning and acquisition of students' skills. This financial shortage does not support suitable working environments that are important for teaching and learning. These findings aligned with those described by Ayonmike, Okwelle, & Okeke (2015a). They claimed that “these challenges include inadequate funding of TVET; inadequate infrastructures; poor power supply; shortage of qualified TVET teachers/instructors; poor supervision of TVET programs; inadequate curriculum planning and implementation.” The current economic recession has not improved things, increasing public deficits and limited fiscal capacity restricting necessary investments in TVET (Okoye & Okwelle, 2013). The consequences for TVET, a sector with already insufficient financial resources, could be severe. Darou stressed that “...la non disponibilité des moyens financiers et techniques entravent le bon déroulement du programme et donc de l'apprentissage et de l'acquisition les compétences des étudiants.” Meaning that “...the unavailability of financial and technical means hamper the program's smooth running and, therefore, the learning and acquisition of students' skills.”

In the same sense, Ngouye added that “...Il arrive que le programme ne soit pas entièrement déroulé à 100% parce que les moyens financiers et matériels ne sont pas mis en place pour ces activités et ça se répercute sur les objectifs du cours et du programme.” Indicated to: “...It happens that the program is not fully completed at 100% because the financial and material means are not in place in time for the course activities, and this unexpected situation has repercussions on the objectives of the course and the program. The TVET institutions received recommendations to generate and retain income from their services and tuition fees to have greater financial autonomy without increasing the public

funding to recruit new teachers and trainers (Ayonmike, Okwelle, & Okeke, 2015a).

Nevertheless, from a long-term perspective, which genuinely meets workforce needs, it will most likely be necessary to imagine innovative financing tools such as services to the card, cost recovery, etc., to establish quality TVET systems. Moreover, this CBA program's implementation faced many challenges in the ATVET organization, management, and delivery to the standardization of competencies in the country. Indeed, the problematic working conditions hinder the smooth running of the CBA program.

The working environment appeared not attractive to boost teacher engagement in the TVET system. Indeed, the work environment impacts practitioners' work in the TVET system and decreases teachers' productivity. The lack of suitable office equipment remains one of the main obstacles for teachers, especially with small budgets. The TVET does not have enough office equipment, which makes the work of teachers not at all easy. These results are similar to those reported by Konayuma (2012). The few office supplies that exist are not only insufficient but are sometimes obsolete. The preparation and implementation of the courses are very complicated with the lack of office supplies. Thus, one consequence is poor academic preparation and work under challenging conditions to have good learning results. Each year, a budget is made available to schools to purchase supplies. Unfortunately, the administrative authorities in charge of budget execution cannot provide office supplies and office equipment for the teachers. It is undoubtedly what Niokhor speaks of as "...il n'est pas facile d'avoir ces équipements ou de répondre aux normes minimales pour faciliter le travail de l'enseignant." translated to "...it is not easy to have these amenities or meet the minimum standards to facilitate the teacher's job." This type of management may reduce the number of office supplies which quickly run out.

The results showed insufficient institutional supports for implementing the CBA program. Indeed, schools' administrations do not have the necessary power to support the CBA program by providing the means that must be installed by local and governmental authorities to reach the training goals of the teachers. Also, the examination of the training models revealed practical problems in quality teaching with the deficit in teaching materials and equipment as expressed similarly by Clayton, Fisher, & Hughes (2005). The shortage of teaching materials and equipment is recurrent in the TVET, similar to Ayonmike et al., (2015a) results. Besides, the fact remains that the infrastructure of existing agricultural training institutions for implementing the program, according to the CBA remains inadequate (Ayonmike et al., 2015a). Mary well describes this situation by explaining that, "En réalité, la pratique des APC ne se fait pas comme elles se devaient dans la mesure où nous n'avons pas le minimum de matériel nécessaire pour appliquer l'APC dans de bonnes conditions." Meaning that "In reality, the practice of CBA is not done as it should be since we do not have the minimum material necessary to apply the CBA in good conditions." Moreover, the budget deficits of TVET, especially agricultural TVET, must force the main actors to give up essential expenses for equipment, operating materials, and supplies for the proper conduct of courses and practical work. This situation is why public and private training organizations will need to be further assisted in having the equipment, materials, and qualified personnel necessary to meet the standards of competence established by the CBA program. The working conditions seemed to influence courses' implementation by being more class lectures than practical or field trips because of the lack of equipment.

The results showed that school managers must better manage an ATVET establishment to achieve the assigned performance. The characterization of these performances must be done by its degree of functioning as an efficient structure, having all

the training needs, and respecting professional standards (Subedi & Shrestha, 2020; Hassan & Maizam, 2017). Thus, according to the results, it seems necessary to make a significant reorganization of the management system of these educational institutions because they want to provide relevant training to students while respecting professional standards and the training needs of the labor market. This finding is in agreement with the work of Omar et al. (2018) and Serumu (2015). Indeed, we learned that they are doing the opposite of the referential guide in implementing the CBA program, which led to problems achieving the objectives as defined in the course repository. Thus the lack of precision in the governance system, the absence of an information system, the absence of regularly updated procedure manuals, or the lack of specific equipment can constitute an element affecting the capacity of the system of TVET (Subedi & Shrestha, 2020; Khasawneh, Miqdadi, & Hijazi, 2014). It is imperative to improve how teachers and administrators manage their needs in terms of appropriate financial management tools, qualified staff, students, school calendar, etc., to prevent the situation from being further critical.

The results showed that school managers must better manage a TVET establishment to achieve the assigned performance. The characterization of these performances must be done by its degree of functioning as an efficient structure, having all the training needs, and respecting professional standards (Subedi & Shrestha, 2020; Hassan & Maizam, 2017). Thus, according to the results, it seems necessary to make a significant reorganization of the management system of these educational institutions because they want to provide relevant training to students while respecting professional criteria and the training necessities and requirements of the labor market. These findings of the case are in accordance with the research works of Omar et al. (2018) and Serumu (2015). Indeed, we learned that they are doing the opposite of the referential guide in implementing the CBA program, which led to

problems in achieving the program's objectives as defined in the course repository. Thus the lack of precision in the governance system, the absence of an information system, the absence of regularly updated procedure manuals, or the lack of specific equipment can constitute an element affecting the capacity of the system of EFPTs (Subedi & Shrestha, 2020; Khasawneh, Miqdadi, & Hijazi, 2014). It is imperative to improve how they manage their needs in terms of appropriate financial management tools, qualified staff, students, school calendar, etc., to prevent their situation from being further critical.

The findings revealed disappointing working conditions with the shortage of supplies. Indeed, the lack of support for the infrastructure and necessary equipment in the operating budget clearly shows the lack of coherent planning of the quality of training for young people. These results are similar to those of Subedi & Shrestha (2020), Serumu (2015), and Lilly & Efajemue (2011). This sub-sector requires substantial resources to finance the essential elements for quality education, such as work equipment, travel for trainers and internships, maintenance of equipment, and infrastructure (Chukwunwendu, 2015; Ismail & Mahammed, 2015; Lilly & Efajemue, 2011). Also, the state of infrastructure in decentralized governance of management and financing of the sector shows less incentive for quality learning. In addition, technical and financial resources are needed to boost learning outcomes, as Chukwunwendu (2015) stated. He explained that "it is only when there is adequate funding that TVET Centers and Institutions can employ trained trainers, support them in updating and upgrading their skills, purchase most appropriate teaching facilities/materials, and instructional technology for practical on-the-job and hands activities training" (p. 24). Therefore, commitments to solving these problems should be prioritized by authorities to boost the teaching and learning of actors and facilitate the integration of young people into the labor market.

The findings described the relationship change between the teacher and the student. Vocational education is a sensitive point in the education system. Quality teaching promotes learning through structured teaching and supportive relationships between teachers and students. It is rare to see interventions aimed at improving student learning that do not make teachers responsible for implementing the reform. This new program made it possible to achieve the training objectives in favor of the new dynamic of interaction between students and teachers in the classroom and outside the classroom. Indeed, they are experiencing challenging relationships with students because teachers and students move from a top-down approach to a more student-centered methods. This situation is maybe the reason for Diarra to say “Les élèves ne sont pas préparés à étudier dans cette nouvelle situation d’apprentissage... Cette liberté d’apprendre en réalité ne les profite pas car ils ne sont pas préparés à cette situation comme nous enseignants avec cette approche.” Coding to “Students are not prepared to study in this new learning situation. This freedom to learn does not benefit them because they are not prepared for this situation like us teachers with this approach.” Also, a great collaboration with teachers comes up in respecting the educational framework of the CBA program, and this new situation drives students to take more interest in the contents of courses. Max conceptualized this situation, saying, “Les étudiants participent davantage à la conception et au déroulement du cours et au choix du contenu...” meaning that “The students participate more in the course's conception and course and the choice of the content...” All participants agreed about the constructive teaching practices that lead students to engage better in the classroom by highlighting their interests. Besides, there is mutual support, which guides students to help teachers to improve their skills in specific tools such as internet research and extra classroom activities. This relationship commitment enhances the strategy towards certain activities where they are more motivated. Additionally, the results manifested

the innovative teaching practice needs to customize teaching tools and adapt them to the needs of students.

The inefficient use of environmental conditions appears as an extra challenge in many schools. Policymakers and school principals could distribute better material resources accompanied by a better allocation of human resources to improve environmental conditions (Subedi & Shrestha, 2020). In addition, the teachers deplore their immediate working environments, which are the results of poor investments. The resources invested in technical education and the material resources of the establishments do not make it possible to create good learning conditions. Students study in an environment that is not conducive to achieving good results. Thus, the quality of school buildings and educational resources play a determining role in student achievement (Mack & White, 2019; Serumu, 2015). Material resources vary with the availability of material resources to varying degrees until the total absence of some of them. The variation in the provision of material, educational, and teaching resources in these schools clearly shows this lack of resources essential to the functioning of the structure and the implementation of teaching and learning.

Research question 2: How do teachers describe the learning experiences of the graduates of TVET programs in agriculture?

Relationships and Participation of students

The findings pointed out positive feedback from the students concerning the CBA program because of valuable educational experience and good service quality. Indeed, the students have adapted to the curriculum and teaching methods as it meets their training needs, and it seems to have led to changes in attitudes in students to show great interest in and outside of class. The results showed that the program maintains a high level of knowledge

with the fundamental elements of understanding the working world (Badenhorst, & Radile, 2018; Marginson & Dang, 2016). Despite the heaviness of the CBA program, students approve it and provide feedback that encourages teachers to be more engaged in mentoring and improving teaching approaches. In addition, the program guarantees the competencies to the students considering agriculture and livestock, and students are confident in making decisions in their learning process to get good grades and performing well. Besides, the program provides to students professional qualification that leads to suitable employment. Darou “Les élèves qui réussissent perçoivent souvent l'école comme essentielle à leur futur bien-être. Cet état d'esprit se reflète ensuite dans leur participation aux cours et aux activités, mais également sur leurs motivations à vouloir créer une ferme agricole.” Explicated to “Successful students often perceive school as essential to their future well-being. This state of mind is then reflected in their participation in courses and activities and their motivations for creating an agricultural farm.”

Furthermore, the engagement of students facilitates their class participation that requires the change of teaching strategy planned during the class lecture. Boy Peul illustrates this wellcoming teaching and learning conditions and talked about “...Il se trouve quand je change d'approche et de technique pédagogique ce sont les élèves eux même qui déroulent le cours. Ce changement m'aide à voir leurs limites par apport aux compétences et de les corriger à temps. Ceci est parfois des indices qui nous aident à comprendre le niveau de compréhension des élèves. J'utilise très souvent la stratégie participative avec une implication à 100% des élèves. Meaning that “...When I change my approach and my teaching technique, the students run the course. This change helps me see their skill limits and correct them in time. Sometimes these are clues that help us understand the level of understanding of the students. I very often use the participatory strategy with 100% student involvement.”

Consequently, the teachers always focus on the program objectives, course objectives linked directly to student learning, and be well prepared for course presentation. Another aspect revealed by finding is that the student's lack of sense of connection with the school and the professional environment. This sentiment of the students indicates the unemployment fear after their graduation and preparation to engage in a prosperous world. The working conditions do not facilitate students' learning to be more comfortable in the classroom because of an unfavorable environment with the lack of necessary amenities. In sum, these students have adapted the curriculum and teaching methods as it meets their training needs. It seems to have led to changes in attitudes in students to show great interest in and outside of class. The results showed that the program maintains a high level of knowledge with the fundamental elements of understanding the working world.

Course Content, instruction, and environments of the classroom

The course content is the teacher's responsibility. The CBA program is well designed to meet labor markets. This change of program accompanies new teaching objectives and training contents that need to be standardized to adapt to the current context of agricultural activity. In addition, achieving the goals of the CBA program may allow all students to achieve their learning goals differently (Constant et al., 2014). The teacher chooses the content according to the homogeneity of class and the student's level of recruitment, the teaching techniques available to him, and the practical work material available (Mukhtar & Ahmed, 2015). The teaching materials are out-of-date with a new program, so the teachers do not choose to implement theoretical instruction. Therefore, they are struggling in selecting courses' content to achieve training objectives. Alamy's belief illustrates this teacher's dilemma in choosing the contents. He said "...cette situation confuse sur les contenus montre bien les difficultés que les enseignants ont par rapport aux choix des contenus les cours. Il faut

noter que le programme requiert beaucoup plus de pratique de théorie malheureusement les conditions ne nous permet pas de faire beaucoup de de pratique.” Signifying that “same program and the same content elements to facilitate the marking of the exams. This confusing situation about content clearly shows the difficulties that teachers have about the choice of course content. This program requires a lot more practical work than theory; unfortunately, the conditions do not allow us to practice much.” Thus, each year the content of the same course may vary depending on many parameters. At this level, the teachers may have differences in content with other training schools because the levels of the students in the same class may differ.

Furthermore, the findings revealed that key aspects of classroom instruction, such as close monitoring, classroom pace and management, clarity of presentation, and course structuring, have positively impacted student success. They are the most visible facets of effective teaching (Badenhorst, & Radile, 2018; Marginson & Dang, 2016). Besides, the results showed the challenges in choosing the content because of the teachers' pedagogical competencies. This situation poses the problem of the contents' choice to be taught in class, the achievement of the objectives, and the skills set out. Course content may allow proper instructional guidance to lecturers and students' practices. However, the large numbers of students characterized by different academic levels face the deficiency of lecture contents that may present insufficiencies in the classroom. Teachers offer class lectures that take into account various groups of students in the same classroom. Thus, these students have different educational levels, knowledge, and aspirations, making teachers' working conditions particularly difficult. This arguably may induce high disappointment for both teachers and students in implementing the CBA program (Badenhorst & Radile, 2018). Therefore, it

appears urgent to harmonize the contents by the authorities and those responsible for vocational training.

The findings reported that the teachers had high achievement expectations for students. At the same time, the participants say they perform their teaching duties with rigor, representing a quality that frequently marks their words. Also, teachers encourage students to give the best of themselves and care about each student's learning, despite environmental conditions are not satisfied. They represent learning with this program as preparation for real working conditions and appreciate that students are always in this same working spirit. This assertion of Darou described well the teaching and learning atmosphere,

“Ainsi, ils apprennent bien leurs leçons et participent très bien activités de terrain suivant les indications de l’encadreur ou de l’enseignant avec respect et courtoisie. La participation des élèves est très satisfaisante parce que dans mes cours car il y’a une familiarité dans la classe. Cela les aide à bien maîtriser les compétences en jeux avec les incertitudes de l’environnement pédagogique.” Meaning, “Thus, they learn their lessons well and participate very well in field activities directed by the mentor or teacher with respect and courtesy. Student participation is very satisfying because, in my lessons, there is familiarity in the classroom. This helps them to master the skills of games with the uncertainties of the teaching environment.”

Indeed, spending whole days with a group of students necessarily creates proximity, if not an intimacy conducive to good learning.

The findings exhibited classroom environments that are not conducive to learning on practical aspects. These insufficiencies of pedagogical means deprived the learning opportunities for students. Therefore, the teachers deal with the teaching guides and the degree of pedagogical freedom in choosing the course contents at their disposal to prepare students to integrate and face the world of work. This teacher mentality helps the students cope with the lack of practical resources and guide them towards developing a social competence sought by employers despite the deprived learning opportunities. Niokhor explained his strategy to help and enhance student learning-“J’utilise le plus souvent

l'approche participative parce que cette méthode me permet d'inclure tous les élèves dans le processus d'apprentissage et de les contrôler leur niveau compréhension pour les techniques pratiques. Je gère leur nombre de participation pour mieux les guider à bien assimiler les compétences en cours. Par exemple, je donne une idée sur les techniques cultural la plus part. Puis, je leur demande réfléchir par rapport à cette idée et faire une synthèse de leurs idées pour faire les travaux pratiques. Cela donne une bonne relation entre les pratiques et les résultats de l'apprentissage." Signifying that "I use the participatory approach most often because this method allows me to include all students in the learning process and monitor their understanding of practical techniques. I manage their number of participants to guide them better to assimilate the skills in progress properly. For example, I give an idea of the gardening techniques most of the time. Then, I ask them to reflect on this idea and synthesize their ideas to do the practical work. This engagement gives a good relationship between practices and learning outcomes." The teaching pedagogies are extensive, although the teaching material is not sufficient for the conduct of the planned teaching activity in the form of a group and practical lesson. In this working condition, the teachers used to vary their teaching styles to diversify students' learning environments and opportunities. The teachers agreed to use participatory teaching to include all students in the learning process and monitor their efficient techniques. In this learning space, teachers draw the lines for students to recognize their competence as professional masters of the content.

Research question 3: How do teachers see the educational experiences influencing the employment and career opportunities of the graduates of TVET programs in agriculture?

Student learning, evaluation, and labor markets

The findings clarified the strength of the CBA program by providing excellent working skills. The CBA program allows students to engage in a well-defined benchmark for

the current labor market to meet the national standards for the agriculture value chain. The CBA program gives opportunities to students to master interesting competencies in terms of the labor market. Also, the program offers teachers and school administrators a large specter of duties that facilitate their commitments within the ATVET schools (Wei & Jamil, 2019; Lamichhane, 2017; Lowitt et al., 2015). Besides, this is an opportunity to help students understand, practice in the field, do internships and share their various learning activities. To provide this support to students, teachers make themselves available outside of school times. They often stay with the students after class and come early before class to be available. This attitude with the students helps the teachers find easy solutions or guide them to choose to overcome the difficulties.

Ngouye's explanation shows teachers' engagement to improve student learning outcomes, including social and academic life. She said taht: “Le programme a permis de mettre en place tant bien que mal dans les écoles de formation agricole des dispositifs de traitement des difficultés des élèves afin de faciliter l’atteinte des objectifs de l’enseignement.” Meaning that “The program has made it possible to set up, as best they can in agricultural training schools, systems for dealing with student difficulties to facilitate the achievement of educational objectives.” These circumstances can result from both instructors’ and learners’ endeavors to incorporate various detailed components to stimulate the multiple reasons and functions. These findings are supported by Badenhorst & Radile (2018) whereby they exhibited that lecturers’ and students’ endeavors include various factors to stimulate the senses. Besides, the students showed motivation and attitudes concerning teaching and le learning, class environments, and instructional applications. Therefore, the skills and competencies implemented to acquire program goals promote autonomy resulting from the learning outcomes and self-regulated activities.

Several varieties of evaluation appeared in the findings of this study. Indeed, the teachers have the abilities and many opportunities to measure the effectiveness of the training program. The written assessment in class as a mid or final exam is one of the strategies used to assess crop monitoring and producing reports. Also, they implemented personal or group research to create a final report as a learning outcome evaluation. In addition, the types of assessment methods provide an appreciation of the theoretical and practical teaching strategies, as Chukwunwendu (2015) notes, and there is a need to develop teaching and assessment strategies to achieve the goals of utilization instructional means. Therefore, the assessment techniques permit to guarantee students' skills and competencies during their CBA training (Badenhorst, & Radile, 2018). Darou illustrated the finding correlation in this terms “Nous avons des évaluations à faire chaque cours et jour pour apprécier les résultats et pour savoir si les élèves ont compris le cours avant de quitter la salle de classe. ... Il est nécessaire de comprendre la compétence précédente avant de continuer avant de progresser sur le suivant.” They are signifying that “We have assessments to do at the start of each lesson and on specific days to assess the results and see if students have understood the task before leaving the classroom. ... It is necessary to understand the previous competencies before progressing to the next one.” This procedure help students will understand lessons and the related competencies be installed (Badenhorst, & Radile, 2018; Marginson & Dang, 2016). Therefore, it is essential to understand the competencies before progressing to the next one.

Highly qualified human resources are needed in the labor markets, and the CBA program can provide the required skilled workers to the job markets. Indeed, the CBA program is designed to develop skills and competencies that facilitate students to get into the professional environment (installed (Badenhorst, & Radile, 2018; Chukwunwendu, 2015). All of the agriculture and livestock practices undergo a training program to meet the needs of

students and producers. The opportunities such as study trips, field trips, and internships empower students to explore the professional working context. They gain knowledge, skills, and competencies that lead to a better appreciation and understanding of the market needs and workforce requirements in different value chains of agriculture employment. Ngouye conclusion clarify the discussion in these words “Le programme permet d’acquérir les compétences nécessaires pour trouver du travail dans le milieu agricole : Oui oui oui, Les compétences.” Explained to “The program provides the skills necessary to find work in the agricultural sector: Yes, yes, yes, Skills.” These findings connect with those developed by Chukwunwendu (2015), which emphasized the qualifications, competency standards, and assessment guides to provide students the competencies and expertise necessitated performing productively in the professional spaces and career path, Consequently, the students have a better recognition of the agricultural profession and the direct environment that improves the labor demand and the production system.

The results reveal an essential office responsible for guiding students to search for job opportunities and availabilities. The insertion organization is a state structure in the TVET system to supervise and support young people in facilitating their job insertion with skills and competencies. It also empowers internship applications after student graduation. Yoro come up with this assertion "La cellule à l’insertion accompagne les diplômés à chercher des finances en facilitant le contact ou le remplissage des formulaires de demande et d’appui au financement" Translated to "The integration office supports graduates seeking finance by facilitating contact or filling in application and funding support forms" to promote the important works of this office in the TVET system. Also, the working options appear in the study, and they are three areas, private job opportunities, public employment, and self-employment (Kanwar, Balasubramanian & Carr, 2019). In all three areas, the insertion office

plays a fundamental role by guiding the students in their administrative procedures to find jobs in agriculture and animal husbandry.

The findings showed through the insertion office to help students understand, practice in the field, do internships and share their various learning activities to be prepared for their future job. This office makes it possible to make students aware of the demands of the agricultural profession, to guide them on choices that correspond to them about the reality of the farming occupation. Indeed, the teachers and the office prepare the pupils for the arduousness of the agricultural trades. The results show that students represent an attractive employment basin for the current world of work (Badenhorst, & Radile, 2018). However, Niokhor presents the current unemployment of the youth. Indeed, he explained that “C'est beaucoup plus compliqué d'avoir un bon boulot. Aujourd'hui nous rencontrons beaucoup d'élèves qui sont des conducteurs de moto appelé “Jakarta” parce que tout simplement il ne trouve pas du travail.” They are signifying that “It is very difficult to find work. Today you meet many students who are moto drivers of the model named “Jakarta” simply because they can't find a job. Nguabou added that “Depuis deux ans, les étudiants sortants et diplômés parviennent à trouver un emploi de plus en plus difficilement parce que leurs nombres ont augmenté. Au paravent, dans les trois premiers mois la moitié arrivait à trouver un emploi.” Translated to, “For the past two years, outgoing and graduate students have been able to find increasingly difficult jobs because their numbers have increased. Previously, in the first three months, half of them managed to find a job.” These situations show the critical condition of the students in finding a job. The difficulties in recruiting students represent a quantitative challenge and solve the qualitative difficulties related to staff competencies.

Research question 4: How can the Technical and Vocational Education Program in Senegal be improved to address workforce needs through teaching and learning strategies?

Resources and financial means

The demand for ATVET skills is high, and the labor market gives strong signals to students to pursue ATVET to lower unemployment (Wei, & Jamil, 2019; (Chukwunwendu, 2015; Ismail & Mahammed, 2015; Lilly & Efajemue, 2011). The transformation of the ATVET requires new teaching and learning strategies that enhance agriculture programs by designing, evaluating, monitoring instruments, and defining indicators to address the teachers' needs and all of the educational courses using material and equipment related to the CBA program. The findings are in line with Liu & Hariyanto (2020; p: 4), whereby they stated that "The more teachers cooperate, the more they are able to converse knowledgeably about theories, techniques, and manners of teaching and learning, and thus improve their instruction." Therefore, updating and promoting the qualities and conditions of the technical and vocational training throughout the teaching and learning offers to better answer the growth of the agriculture value chain.

Many shortcomings plagued the ATVET system, including the weakness of the training offered and the obsolete nature of the course's materials and types of equipment. Also, the ATVET resources such as human, material, financial and organizational are insufficient, inadequate, and outdated concerning the requirements and expectations of agricultural education. In addition, the operating budget presents deficiencies to support the infrastructure and necessary equipment in the coherent planning of the quality of training for young people (Subedi & Shrestha, 2020; Serumu, 2015; Lilly & Efajemu, 2011). Nguabou uses these words to explain the above ATVET situation about the material necessary for the

proper conduct of learning to appreciate the skills and competencies acquired by the students. Indeed, the teachers need to have classrooms to implement the instructions to face the types of equipment and teaching methods. Despite these deficiencies, the interviewees defend the need of the ATVET to transform the current educational system for the industry-transforming realities. Indeed, this transformation may begin with the evaluation, which should be shifted from the old program guides to the latest recommended tools using material and equipment related to the CBA program. Also, the teachers may introduce some changes concerning the courses to meet the market's needs better. All interviews accepted the necessity to continuously improve the TVET programs for workplace realities (Kirior, 2017).

Indeed, today participants recognize the rare revision of the TVET program to the market's needs due to the lack of resources and financial means. The program has to be evaluated to be able to update within the collaboration between teachers, authorities, and the industries. The results tie in with those reported by Kirior (2017), where he defends the necessary strategy to improve the TVET curriculum to be meaningful and effective to address the challenges better. This approach will support the improvement to match the training requirements and the increasing demand of the workforce and mobilize resources. More specifically, the participants of this case study claim that the authorities must ensure modernization of the class environments and educational materials such as projectors, course manuals, administration supports, offices, printers, etc., according to training and technological developments the Technical and Vocational Education.

The results have shown a deficit of professional development activities for teachers to benefit the intellectual environment. Prioritize teacher training is crucial to address the workforce demands and raise all teachers' proficiency levels in the TVET system (Kirior,

2017; Chukwunwendu, 2015; Ismail & Mahammed, 2015). Also, interviews claimed their need for capacity building to upgrade the teaching and learning strategies imperative to their learning processes. To illustrate this demand Ngouye talked about that "nous avons besoin des techniques spécifiques pour animer une classe, de bien communiquer en classe, de faire participer les élèves, de contrôler les élèves, de préparer ces fiches de cours etc." translated to "we need specific techniques to lead a class, communicate well in class, involve the students, control the students, prepare these lesson sheets, etc." The professional development program for teachers is an excellent opportunity to perfect the teaching approaches to better train the students. Indeed, teachers have the necessary knowledge for most teaching techniques to be facilitating field works, lab, and innovation. Therefore, changing the working conditions is primordial to meet the training objectives and achieve the programs' goals in terms of skills and competencies because of the lack of teaching techniques (Liu & Hariyanto, 2020; Kirior, 2017). The effectiveness of teachers in ensuring that their students are dedicated to learning during a class depends fundamentally on their ability to manage and focus on each student's education.

Infrastructure, equipment, and management

Beyond the lack of or inadequate infrastructure, the availability of teaching materials and support school administration is one of the limiting factors for the quality of vocational training. ATVET schools often do not have enough and qualified teachers to implement diverse teaching strategies. Therefore, the need for capacity building to support them appears in the results, and training trainers from vocational training institutions is essential and even very urgent (Kirior, 2017; Chukwunwendu, 2015). This urgent need pushed Niokhor to emphasize that "Je suis très déçue de cette formation qui a duré 2 mois parce que je n'ai

bénéficié d'aucune avancé sur le plan pédagogique que je pouvais utiliser en classe avec mes élèves ou de l'exercer dans la salle de classe.” translated to “I am very disappointed with this training, which lasted two months because I did not have any educational advancement that I could use in class with my students or practice it in the classroom.” Regarding specifically agricultural activity, the current level of delivery of agricultural courses seems very limited because of the real possibilities and the demand of the main targets who are very aware of the fundamental role of skills building to improve pedagogical approaches.

The competencies-based approach is still barely perceptible in implementing learning, with the absence of pedagogical dynamism likely to transfer the acts included in the program and application to entrepreneurship and transformation. Another urgent aspect that emerges from the findings is the choice of course content and the lack of inspection by mentors in the educational activities. Boy Peul clarifies this issue by telling this “Moi qui suis dans le domaine de l'élevage, on m'envoie un inspecteur en comptabilité pour évaluer mes fiches de cours en élevage, mes pratiques pédagogiques et l'environnement de la classe. Je ne comprends pas qu'est-ce qu'un tel inspecteur peut m'apporter pour l'amélioration de cours en élevage.” Expressed as “I am in the field of animal husbandry, and I am sent an accounting inspector to assess my course sheets in breeding, my teaching practices, and the classroom environment. I do not understand what such an inspector can do for me for the improvement of breeding courses.” Besides, teachers must be able to choose the accurate and most relevant course contents to achieve program goals, but they lack in making these choices. Boy Peul characterized this lack by saying, “...Cela permet à chaque enseignant de reconnaître le travail effectué pour réussir sa mission de formation.” Meaning that “This allows each teacher to recognize the work carried out to succeed in his training mission.” The results also exhibit challenges in choosing course contents because they do not get the training and capacity-building

courses focusing on choosing course contents to meet the program's objectives about the skills and specific objectives of the course. Moreover, the capacity-building program helps teachers to adapt and better understand the needs of students and choose contents that promote their motivation and success.

Pedagogical competency training needs

The findings demonstrate the pedagogical competency training needs to improve learners' experiences in the educational system (Kirior, 2017; Ajithkumar, 2016; Chukwunwendu, 2015; Paryono, 2015). The knowledge and skills of participants are updated in several ways and with different actors. As in the ATVET education system, they distinguish the self-training in the teaching team, the pedagogical discussion group, and the training in educational innovations initiated by the central or regional authorities. Indeed, all participants acknowledged the advantages of these training opportunities in developing effective teaching methods. The pedagogical discussion group appears to be the most important pedagogical improvement way. Indeed, the objectives of the pedagogical group aim to facilitate the teachers' pedagogical practices. Max explained that “La cellule pédagogique nous permet de discuter nos difficultés pédagogiques. la cellule nous aide beaucoup dans le choix des techniques pédagogiques adaptées, du choix des contenus et le renforcement de nos capacités pédagogiques” to prove its essential characters. Transcribed as “The pedagogical team allows us to discuss our educational problems. The pedagogical team helps us a lot in choosing suitable teaching techniques, the choice of content, and strengthening our teaching capacities.” In addition, the group discussion helps to run the program smoothly and minimize the loss of time in managing difficulties resulted from the lack of teachers’ pedagogical competencies.

Moreover, the pedagogical discussion group represents a formal framework for professional development. In addition to direct action, it sets up a dynamic for sharing experiences and training between peers. The sharing experiences guide teachers to respect the referential guide of the CBA program. It also permits the teachers to harmonize the course contents in the ATVET system to enhance the learning outcomes. Max added that “Cette cellule nous permet d’harmoniser les contenus bien vrais que nous rencontrons beaucoup de difficultés pour cette harmonisation des contenus” translated to “his teacher's team will enable us to harmonize the course contents” to exhibit these findings. Thereby, they coordinate the courses' progression, achieve the standardization of learning, and take charge of the teachers' difficulties in their daily practices according to the level of the students and the teaching materials available.

Final certification

The final certification exam appears for all participants as a concern in enhancing the learning strategies in implanting the CBA ATVET programs. Thus, this management of the CBA program poses a big problem because of course contents and certification exams. Nguabou expresses that “APC programme pose un grand problème, oui un grand problème pour la certification” meaning that “CBA program poses a big problem, yes, a big problem for the certification” to demonstrate how challenging is the implementation of the program to meet the learning strategies of the students. The CBA program is an excellent instrument to encourage students to enhance their learning strategies while pursuing their diplomas. However, the CBA program is established with a progressive assessment of competencies for students to earn their certifications. Besides, all participants rejected the academic authority's decision to maintain the final exam certification despite the CBA program strategies.

Implementing the CBA program strategies may improve diplomas' issuance and boost the technical training and technicians in high demand for agricultural labor.

The ATVET systems need a certain managerial autonomy. However, they do not have enough financial resources to manage themselves because of insufficient annual grants. Niokhor explains this situation by saying that “Il faut noter que les budgets sont insuffisants car le budget total venant de l'état ne peut pas satisfaire les besoins de la filière élevage juste pour montrer l'insuffisance du budget de l'école.” translated to “We know that the budgets are insufficient because the total budget coming from the state cannot meet the livestock sector's needs to show the school's inadequate funding.” To overcome this situation, the school administrators try to have additional financial means to complete the necessary equipment for practice. Indeed, the shortage of material and equipment means hindrances to the success of the educational activities. The results advance the urgent need to restore the school material and equipment by the initiative of the school administration in the agricultural vocational training schools. Thereby, governments and academic authorities must facilitate financing to establish much more flexible management strategies to help actors commit financially.

Using Program Planning to support the results

Program planning is crucial to improve an education system by implementing professional development for all people involved in the process. It is defined as a social activities that stakeholders negotiated educational and professional programs through personal, organizational, academic, and social interests in circumstances and conditions that lack essential resources (Cervo & Wilson, 2006). Also, program planning offers adult learners, educators, and staff a guide to develop programs that promote professional and institutional developments because they are shared ideas of how the curriculum is assembled

and the required components to assure success (Caffarella and Daffron, 2011; Caffarella, 2002). Indeed, the lack of adequate infrastructure, teaching materials, and support of school administration constitutes restricting factors that impacted the quality of vocational training at ATVET schools. Therefore, it is essential to design and implement program planning to have enough qualified teachers to perform diverse teaching strategies. Also, there needs to be an improvement of resources to support the implementation of teaching practices. Thereby, Boy Peul thought that

“... Par ailleurs, les équipes d’enseignants pose un autre regard sur leurs pratiques et à mesurer à la fois les points forts, les réussites et les aménagements à apporter pour faciliter la réussite de leur inspection. Nous pensons tous que cette démarche ne peut se réaliser pleinement que dans une dynamique collective et de renforcement la continuité et la cohérence des pratiques au sein d’un même établissement. Cela permet à chaque enseignant de reconnaître le travail effectué pour réussir sa mission de formation.” Meaning that, “in addition, the teaching teams take a different look at their practices and measure both the strengths, successes, and arrangements to facilitate the success of their inspection. We all believe that this approach can only be fully realized through a collective dynamic and strengthening the continuity and consistency of practices within the same establishment. This allows each teacher to recognize the work carried out to succeed in his training mission.”

The program planning makes it possible to have a consensus on the professional development of the various actors of the TVET system. A consensus emerges in the educational communities represented in this study indicating a need to improve the development of the TVET system. The fact that capacity building is the engine of human growth constitutes an essential element to face the financial and material crises of the current TVET system. The development of institutional capacities allowing for the design and implementation strategies through program planning minimizing the impact of these crises will remain essential to ensure the continuity of the process to achieve youth development goals. Capacity building starts from the premise that people can reach their full potential when the means for advancement are sustainable. This evolution should be locally developed for the long-term

and generated and managed collectively by those who benefit from them. This statement from Niokhor shows the importance of using a planning program to include all stakeholders. And Niokhor added that « Je suis très déçue de cette formation qui a duré 2 mois parce que je n'ai bénéficié d'aucune avancé sur le plan pédagogique que je pouvais utiliser en classe avec mes élèves ou de l'exercer dans la salle de classe. Je peux dire que c'est le développement et formation personnel seulement qui peut aider améliorer ta pédagogie dans nos conditions actuelles de travail.» translated to "I am very disappointed with this training, which lasted two months, because I did not have any educational advancement that I could use in class with my students or practice it in the classroom. I believe that it is only personal development and training that can help improve your pedagogy in our current working conditions." It, therefore, acts to create new institutions or strengthen existing institutions with their staff and partners. Thus, the development of planning programs is a priority for education and training. Likewise, it allows having a global vision in which it is a question of bringing about a transformation generated from the inside and maintained over time.

Conclusion

The participants of this case study had various years of professional experience in the ATVET system and academic levels. The findings revealed that all participants are well experienced and knowledgeable about working in strenuous physical and instructional conditions. The lack of infrastructure, equipment, and class facilities appears in the findings as significant problems of the ATVET. The availability and quality of material resources such as teaching materials and class sizes pose problems in teacher satisfaction in the classroom to boost learning outcomes. Thus, the didactic equipment also remains very insufficient and poorly diversified, which testifies to the limited pedagogical approaches used in these structures. Therefore, the education system is confined within four walls because the TVET

does not have the essential equipment and infrastructure for the class instructional processes. The deterioration of the ATVET supplies and means such as human, material, financial and organizational influences the expected teaching outcomes because of insufficient and inadequate teaching and learning methods. Thereby, all authorities must consider the requirements and expectations of the CBA program within the sustainability of the infrastructure, the learning environment, and the efficiency of maintenance to improve the technical context.

In addition, the adoption of the skills-based approach constitutes a pedagogical innovation in the education system. This new agricultural training program augurs well for better quality learning in the agriculture education system because it is more practical and linked to working life. The teachers are well experienced for the most effective use of limited pedagogical resources and found alternative solutions for confronting these challenges to implement courses. In addition, the researchers found a positive impact on student success by analyzing the aspects of classroom instruction, such as close monitoring, classroom pace and management, clarity of presentation, and course structuration. Participants agree there is no single and precise way to teach best and assess students. Therefore, these limited working conditions incite teachers to adapt the teaching approaches to improve student learning. Moreover, the extra classroom activities that teachers provide to students improve the teaching methods use in the classroom.

The CBA program aims to set up best practices in agricultural training schools. Still, it is challenging to meet all training strategies and assessment methods for possible skills and competencies. Indeed, the teachers require professional development activities to address these challenges to enhance the students' learning processes. The need to improve the teaching skills appears essential for capacity building to perfect the teaching methods. Also, the

accompanying measures for the reformed program have not been provided, especially regarding the training of teachers. In addition to teachers not being trained, the manuals to support innovation are not available to the participants to succeed in their training mission. Besides, the teacher workforce necessitates teaching and learning strategies to select the course content. The course content constitutes a difficulty for teachers to reach the CBA program goals and teaching outcomes. Indeed, teachers must be able to plan lessons, learn lessons, prepare lessons, apply teaching methods and techniques and evaluate learning according to the CBA program. Moreover, the certification system shows misunderstanding between the academic authorities and teachers who implement the CBA program. Indeed, the certification system can help create a quality assurance system. However, the educational leaders have finally decided to maintain the final certification despite the progressive assessment of competencies from the first to the third year to get his CBA certificate.

The program system combines formal vocational education and training based on the workplace to help students passing from academy institutes to the workforce professional world more quickly. However, the shortage of financial means, the obsolescence of equipment, and outdated infrastructure constitute challenges for school and governmental administrations. The ATVET has a chronic budget deficit and an administration that does not facilitate the development of agriculture. Therefore, the ATVET schools need immense support on all fronts to meet the challenge of improving training programs. The school authorities must make budgetary decisions relating to personnel, operation, and the correct conduct of courses. This situation results from a school administration that fails to create partnerships with industries in the area or projects to increase budgetary means to promote training opportunities. Consequently, ATVET would benefit from greater financial autonomy to carry out this program to meet market demand.

Recommendations

The finding and conclusions of this case study guide the following recommendations:

Professional development programs. The teachers need these programs to include teaching skills applicable in the local labor market. They deserve necessary technical support to serve students better. The actual use of information tools and communication technologies must be systematic in vocational instruction and learning to improve its quality. Also, school administration and authorities should implement continuing professional development programs as scheduled in the program planning to meet the training needs to improve the teachers' professional development plans. Besides, the professional development program should be medium and long-term to enhance teacher professionals' practical training to select effective teaching styles and instruments, leadership and management experiences, and competencies. The teachers' professional programs for development can be designed by using Cervero & Wilson, (2006) program planning model because it is an excellent tool to negotiate the learning needs.

Moreover, authorities of the institutions must strengthen the quality of training of trainers programs, particularly by facilitating experimentation and innovation with the participation of the private sector. Teachers suggest making efforts to upgrade their competencies through available training resources like the internet, network, sharing experience, etc. In increasing their educational level, teachers will expand their professional competencies and up-date their technical knowledge and skills to address students' competency needs and meet job market requirements.

Increasing financial means. The state authorities have the primary responsibility for mobilizing and allocating the financial resources necessary to establish an accessible and

quality TVET education system. Indeed, Cervero & Wilson, (2006) program planning model offers four negotiation steps to build a strong financial management system that sustains the TVET education system. The inadequate financial support impacts the TVET system's ability to achieve its training mission. Consequently, improving the TVET financing mechanism is an essential option for its development. Today, it is crucial to find a more harmonized model for granting financial resources to vocational training institutions for the overall coherence of the sector's financing. Beyond this situation, the potential contribution of the private sectors, local and civil communities to the development of TVET must be developed and diversified to meet students' training needs. Also, funding has to increase to improve teaching qualities to enhance student learning. Innovative mechanisms for sustainable financing and resource mobilization are a prerequisite for the success of TVETs. Indeed, education programs for externally designed and funded TVETs inevitably lack coherence, and their impact is always limited. Therefore, new financing mechanisms to alleviate the burden on the public sector must be implemented, including effective mobilization of the private sector.

Infrastructures and equipment. The results of the study showed an advanced state of disrepair and without adequate equipment of the TVETs. Under these conditions, the new TVET infrastructure and equipment must constitute a revealing and visible element of the revolution to improve the teaching and learning environment. Indeed, Cervero & Wilson, (2006) program planning model helps to evaluate infrastructure and equipment needs to develop the TVET system. In order to change the training paradigm of TVETs, the state authorities must align with the current practices, the contents, and delivery methods. Indeed, TVET is, therefore, a high-priority investment sector for Senegal to increase the resources allocated to acquire modern equipment and facilities. Equipped with modern equipment,

TVET establishments can directly involve their students in business life. Indeed, TVETs may be called upon to bid on calls for tenders to provide some remunerated services to companies, often in the field of agricultural equipment maintenance. Degradation of TVET equipment results from suboptimal use with a very low rate of return. The question of profitability can find a solution through a good sharing of such equipment between TVET institutions or by renting a usage time for the productive sector in the agricultural value chain where learners are directly associated. This way of doing things, which strengthens partnerships with the productive sector, contributes even more to enhance the entrepreneurial spirit and develop the cooperative spirit.

Administrative management. Technical and Professional education is considered a path for the less academically gifted. Low academic admission requirements support this perception with limited programs and prospects for continuing education and professional development. The reinforcement of the management and support of the directors of TVET becomes an urgent matter to improve their performances. School principals are responsible for good educational and administrative leadership that enables schools to be learning spaces. Supporting school principals begins by defining their role and relieving them of administrative tasks to devote themselves to the educational support of their teachers throughout a program planning. Ministries responsible for TVETs should put in place career paths for principals based on transparent and merit-based selection, assignment, and evaluation mechanisms. In addition, it is necessary to identify teachers with the required profile and motivation to become principals and provide them with the training that will empower them to strengthen their management and leadership capabilities and improve the mission of these schools. The authorities should invest in developing tools of general interest that the administrator can use to assess the functioning of TVET systems and carry out the

actions necessary to improve them. Use the resources available to enhance the quality of education services because they lack the financial management, procurement, and administrative capacities needed to improve learning and human capital. State authorities and TVET directors must develop multidisciplinary, technical, and managerial expertise to design and implement action and marketing plans.

Improve access to information from the scientific research. Research data and appropriate teaching methods should be planned by the governmental authorities to harmonize and help teachers better communicate and enhance the educational process. The ATVET and research education network will allow centralizing teaching and learning materials and academic documentation to solve the teachers' need to improve their education styles. The improvement of access to research information will help develop and identify tasks and expectations to enhance communication and interaction between school administration, governmental authorities, teachers, and ATVET partners. The ministries should create resource network centers to help teachers to obtain the updated teaching and learning information.

Hiring qualified and motivated teachers. Most teachers involved in technical education have an adequate level of academic training. However, there are serious gaps in experimental, vocational, and technological education because the teachers themselves have been trained throughout their careers in laboratories that do not meet the standards. Therefore, to raise the skill level of all instructors, the government should consider unifying the structure of certification by increasing the qualification of trainers in vocational training centers by negotiating and implementing program planning sessions. Teachers are the primary resource of an education system. Thus, poor management of teachers' careers can lead to an overload

of work that, combined with low salaries, negatively impacts teacher motivation. The government must support the strengthening of instructor training program's quality, particularly by facilitating experimentation and innovation. Besides, local authorities and government should hire qualified teachers given the evolution of occupations in the agricultural sector to address the needs of students to apply best practices. Indeed, strong motivation and competencies are critical to delivering knowledge, skills, and field experiences to students and positively impacting the TVET system.

Improving linkages with the agriculture value chain. Program planning can be the great source to assess the needs to enhance the linkages in the value chain. This investigation displays the significance of connections between the TVET schools, the public and private sectors. It is imperative to develop sustainable networks between the ATVET system and professionals in the value chain to promote and develop collaborative strategies. The linkages need to be created and improved to support practical activities, classroom learning, and access to research information. The importance of ensuring the sustainability, mainly financial, of consultation and partnership frameworks remains a concern. The financial autonomy of TVETs consists in seeking financing funds between actors in the value chain and government authorities. The mobilization of private financing is an avenue to be explored, with the possibility of distributing the funding between stagers and state, accompanied by public financial incentives in grants, loans, or loan guarantees. Building solid and efficient public-private partnerships is a significant and strategic concern for the renovation and strengthening of vocational training systems. Therefore, the connection should ensure that all actors involve in the ATVET system and agriculture value chain are working together to reach the educational goals in a collaborative environment.

Recommendation for Further Research

The following fields require to be directed by additional investigation:

1. This research should be realized in other ATVET schools of Senegalese's regions because the study's goal needs further comprehensive investigation so that diverse aspects and ATVET characteristics may arise and confirm the initial findings. Also, the findings of this investigation led to an understanding of insufficient training of instructors, obsolete training material, and lack of training material. These critical factors combine to reduce training effectiveness in achieving the knowledge and skills objectives required by labor market standards. In addition, identifying other educational programs that could strengthen the ATVET system is crucial to incorporate into students' and producers' needs to ensure sustainable TVET expertise.
2. Studies should be carried out to interrogate numerous ATVET organizations that negatively impacted the compositions, policies, structures, and human resources to improve the instructional system (Cervero and Wilson, 2006). In addition, teachers' advancement programs are essential to enhance their knowledge and skills to serve the students better. Indeed, a professional development program is an ongoing social activity where people's interests are causally related to ensuring quality education. Thus, this research must produce models of training for the teaching profession that guarantees the acquisition of pedagogical and technical skills. The results will guarantee adequate and productive school management of technological, environmental, means, and resources in the TVET system. Therefore asking the question "What are the significant aspects to take into account in the TVET organization of careers?" among others may guide the process.

3. Researchers should carry out a study to identify teachers' perceptions about teaching and learning competencies regarding the agriculture value chain. The study processes could allow participants to indicate specific preferred teaching styles, classroom management, expectations and satisfaction job, and assessing the TVET program for students' future. Also, researchers suggested that a replication of the study be carried out to compare teachers' perceptions of the TVET system and those from the industries about teaching and learning methods. Analyzing the different factors that impaired the education system should call for the inclusion of varying knowledge and skills to improve these factors in the TVET system.
4. Search for efficient actions of the TVETs, particularly with a view of students' professional integration into the labor market, can necessitate the collaboration of the professionals. Indeed, the social and professional integration of students has become a significant issue in Senegal. The opening and diversification of markets further reinforce the need for competitiveness in the agriculture value chain to become a strategic investment. In a context of strong demographic growth and limited resources, the TVET training system offers a vector for the development and the possibility to overcome the economy's needs.

Educational implication and significance

This case study investigated what needs to be done to improve agriculture technical and vocational education programs in Senegal by focusing on pedagogical aspects and teaching strategies to address the new growing competency demands of the different value-chains within the agriculture system in Senegal. The study's implications may include planning, implementing, and assessing educational programs focused on teaching and learning in the TVET system. Thereby, it is necessary to understand TVET characteristics

to develop well-designed assessment programs to determine opportunities and challenges. Teaching and learning are concepts that are pivotal to students' success in their educational goals. According to this study, the availability and quality of teaching materials and class sizes pose problems in teacher satisfaction in the ATVET classroom. The didactic equipment also remains very insufficient and poorly diversified for the pedagogical approaches used in these structures.

The situation implies improving the working conditions to help teachers develop adequate teaching methods with different concepts developed in the agriculture value chain and CBA program. Therefore, it is fundamental to create good instruction conditions such as field works, lab, and class organizations to install a sustainable TVET system. The participants agreed that the challenges and opportunities that professional development competencies may lead in implementing class activities. Indeed, the academic authorities have to progressively assess the competencies that the ATVETs are providing throughout the teaching and learning processes. Moreover, this situation results from school administrations that do not evaluate the education system and promote training opportunities. Consequently, ATVET may benefit from greater teaching material autonomy to carry out this program to meet market demand.

Summary

The TVET system is used to acquire skills to find decent and sustainable employment. It must, therefore, meet the needs the expectations of the professional world (Lamichhane, 2017; Konayuma, 2012; Lilly & Efajemue, 2011). In Senegal, vocational training is taking place in the context of a rapid increase in the young population, the decrease in job opportunities in the public sectors, an increase in competition between job seekers in the private labor market, and sustained growth in the informal sector (Liu, Liu, & Hariyanto, 2020; Lowitt et al., 2015). Besides, the improvement of the pedagogical quality for teachers in vocational education constitutes an essential element. It has a role inadequately skilled workers with Competence-based approach (CBA) program (Okoye, & Okwelle, 2013). The teachers' profession needs to be reviewed to meet the required pedagogical expertise profile in the CBA program (Omar et al., 2018; Ramadan, Chen, & Hudson, 2018; Paryono, 2015). Therefore, the research aims to investigate what needs to be done to improve TVET in agriculture (Agricultural Vocational Education and Training) programs in Senegal. Thereby, the study focuses on pedagogical aspects and teaching strategies to address the new growing competency demands of the different value chains within the agriculture system in Senegal.

The researchers organized this case study into five chapters. Indeed, chapter one includes an introduction, problem statement, purpose and research questions, theoretical Framework, program planning models, the significance of the study, and definition of terms. The chapter defined the TVET as an educational and training that provides opportunities for people for remunerative employment. Also, it gives the principal goals of the TVET system to afford youth with the technological and professional abilities demanded by the social and economic development as future entrepreneurs and self-employed individuals (Hassan, B., &

Maizam, A. (2017; Chukwunwendu, 2015; Fedorov, & Davydova, 2014; Constant et al., 2014; Union, 2007).

Chapter two explained the program planning as a theoretical framework that focused on how teachers prepared and implemented the lessons and cooperated with their colleagues and others to implement the TVET educational program. Moreover, the program planning provided direction for the researchers to examine the TVET Program's implementation and its possible progress by adapting the pedagogical strategies or teaching and learning strategies. Also, to carry out this reflection, we looked at the challenges that TVET and the different actors involved in TVET must overcome to achieve a vocational training system adapted to the professional integration of young people in Senegal.

Le chapter three explained the methods uses in this qualitative investigation, and they included the justification for choosing a case study as a qualitative design to implement it. Also, data were collected by researchers throughout interviews to obtain a rich understanding of the need for improvement in the TVET system. The site and participants' selections help to understand the characteristics of the stakeholders, which were the teachers in the TVET system. Besides, the data analysis contributes to understanding data gathered from the teachers. The validation strategies were necessary for this study because they can guide to generalization of the findings. Likewise, the limitations and research subjectivity permits understand the level of bias that affects the results and the challenges that researchers have faced during the process.

Chapter four provides a comprehensive analysis of the diverse themes from the four inquiry interrogations and presents an in-depth comprehension of the shareholders' ideas and viewpoints concerning the challenges and possibilities of the agricultural TVET Schools. The case study was beneficial to discovered several issues that are disturbing TVET teaching and

learning strategies and some ways for solutions to improve them, institution functioning system and education levels.

Chapter 5 discuss the findings of the four research questions to clarify the imperfect TVET teaching and learning strategies. This chapter focus on the organization, management, and teaching_methods implemented in the TVET system. Also, it explained the financial means, school management, environmental conditions, and relationship working environment for the learning and acquisition of students' skills. Indeed, the discussion showed the insufficiencies of every resource provides to the TVET system by the authorities. In addition, the debate adds a good understanding of the new types of relationships that have been created with teachers. Besides, the course Content, instructions, and environments of the classroom appeared as a vital deficiency that needs to be addressed to improve the student learning, evaluation processes to meet labor market technical and competencies demands. The discussions clarified the findings to strengthen the CBA program by providing excellent takeaways of the case study.

Lastly, the study presents the conclusion and recommendation that align with the findings to address the TVET requirements to build substantial humans resources to respond to workforce requirements. The recommendations focus, among others, on the professional development programs for teachers, which appear as a crucial element of the teachers-successes in teaching students acquired the competencies to fit job market demands. It also asks for hiring qualified and motivated teachers to have a sustainable TVET system in agriculture.

References

- Adams, A. V., Johansson de Silva, S., & Razmara, S. (2013). *Improving skills development in the informal sector: Strategies for Sub-Saharan Africa*. The World Bank.
- Afeti, G. (2018). Revitalizing technical and vocational education and training in Africa: Issues outstanding. *Journal of Vocational, Adult and Continuing Education and Training*, 1(1), xi-xi.
- Ahmad, M. Salleh, K. M., Sulaiman, N. L., & Latif, A. A. (2016). The Development of Human Resource Competency Model in Public Sector Organizations in Malaysia, *International Journal of Applied Business and Economic Research*, 1 (2), 78-97.
- Ajithkumar, M. U. (2016). Training of teachers: Institutionalising training and development of academic faculty of TVET institutions for realising excellence. In *India: Preparation for the World of Work* (pp. 183-210). Springer VS, Wiesbaden.
- Ajzen, I. (2012). Martin Fishbein's legacy: The reasoned action approach. *The Annals of the American Academy of Political and Social Science*, 640(1), 11-27.
- Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. *The handbook of attitudes*, 173(221), 31.
- Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European review of social psychology*, 11(1), 1-33.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11-39). Springer, Berlin, Heidelberg.
- Ajzen I. et Fishbein M. (1980), *Understanding attitudes and predicting social behavior*, Englewood Cliffs, Prentice Hall.
- Ajzen I. et Fishbein M. (1975), *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA, Addison-Wesley.
- Aronfreed, J. (2013). *Conduct and conscience: The socialization of internalized control over behavior*. Elsevier.
- Asghar, M. Z., Hakkarainen, P. S., & Nada, N. (2016). An analysis of the relationship between the components of entrepreneurship education and the antecedents of theory of planned behavior. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 10(1), 45-68.
- Ayonmike, C. S., Okwelle, P. C., & Okeke, B. C. (2015a). Towards Quality Technical Vocational Education and Training (Tvet) Programs in Nigeria: Challenges and Improvement Strategies. *Journal of Education and Learning*, 4(1), 25-34.
- Ayonmike, C. S., Igberadja, S., Igberaharha, O. C., & Okeke, B. C. (2015b). Status of Partnership between TVET Institutions and Industries in Delta State, Nigeria. *International Journal of Vocational Education & Training*, 23(1).

- Ary, D., Jacobs, L. C., Razavieh, A., & Sorensen, C. (2006). *Introduction to research in education* (7th ed.). Belmont, CA: Thomson Wadsworth
- Badenhorst, J. W., & Radile, R. S. (2018). Poor performance at TVET colleges: Conceptualising a distributed instructional leadership approach as a solution. *Africa Education Review*, 15(3), 91-112..
- Boitshwarelo, B., & Vemuri, S. (2017). Conceptualising strategic alignment between curriculum and pedagogy through a learning design framework. *International Journal for Academic Development*, 22(4), 278-292.
- Bound, H. (2011). Vocational education and training teacher professional development: tensions and context. *Studies in Continuing Education*, 33(2), 107–119.
- Bunch, J. C., Blackburn, J. J., DanJean, S., Stair, K. E., & Blanchard, L. D. (2015). Examining Louisiana State University College of Agriculture students' perceived motivators and barriers to participation in international experiences. *Journal of International Agricultural and Extension Education*, 22(3), 69-82.
- Cafferella, R. S. & Daffron, S. R., (2013): *Planning programs for adult learners: A practical guide for educators, trainers, and staff developers* (Third ed.). San Francisco: Jossey-Bass.
- Caffarella, R. (2002). *Planning programs for adult learners: A practical guide for educators, trainers, and staff developers* (second ed.). San Francisco: Jossey-Bass.
- Cervero, R. M., & Wilson, A. L. (2006). *Working the planning table: Negotiating democratically for adult, continuing, and workplace education*. San Francisco: Jossey-Bass
- Chukwunwendu, A. F. (2015). New dimensions in sourcing and utilization of resource materials for effective teaching and instruction in technical vocational education and training (TVET) in Nigeria. *Education Journal*, 4(6-1), 24-30
- Clayton, B, Fisher, T & Hughes, E 2005. *Sustaining the skills base of technical and further education institutes: TAFE managers' perspectives*, NCVET, Adelaide.
- Constant, L., Culbertson, S., Stasz, C., & Vernez, G. (2014). *Improving Technical Vocational Education and Training in the Kurdistan Region--Iraq*. RAND Corporation. PO Box 2138, Santa Monica, CA 90407-2138.
- Davis, J. (2019). *Teaching strategies for the college classroom*. Routledge.
- Deguenonvo, M. H. J. (2019). South Korea's Development Cooperation Policy (Approach) in African Countries: the case of Senegal (Doctoral dissertation).
- De Leeuw, A., Valois, P., Ajzen, I., & Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions. *Journal of environmental psychology*, 42, 128-138.

- Evans, W., Kadirov, K., Thior, I., Ganesan, R., Ulasevich, A., & Deperthes, B. (2019). Willingness to Pay for Condoms among Men in Sub-Saharan Africa. *International journal of environmental research and public health*, 16(1), 34.
- Eicker, F., Haseloff, G., & Lennartz, B. (2017). *Vocational Education and Training in Sub-Saharan Africa*. W. Bertelsmann Verlag.
- Fedorov, V. A. & Davydova, N. N. (2014). Control of the research and education network development in modern socio-pedagogical conditions. *Scientific bulletin of National Mining University*, 2(140), 126–133.
- Erlam, G., Smythe, L., & Wright-St Clair, V. (2018). Action research and millennials: Improving pedagogical approaches to encourage critical thinking. *Nurse Education Today*, 61, 140-145.
- Filmer, D., & Fox, L. (2014). Youth Employment in Sub-Saharan Africa [L’emploi des jeunes en Afrique subsaharienne-Rapport complet]. *World Bank Publications*.
- Fishbein, M., & Cappella, J. N. (2006). The role of theory in developing effective health communications. *Journal of communication*, 56, S1-S17.
- Florian, L. (2015). Inclusive Pedagogy: A transformative approach to individual differences but can it help reduce educational inequalities. *Scottish Educational Review*, 47(1), 5-14.
- Francis, J., Eccles, M.P., Johnston, M., Walker, A.E., Grimshaw, J.M., Foy, R., Kaner, E.F., Smith, L. and Bonetti, D. (2004). Constructing questionnaires based on the theory of planned behaviour: A manual for health services researchers.
- Fretschner, M. (2014). Ajzen’s Theory of Planned Behavior in Entrepreneurship Education Research. In *Becoming an Entrepreneur* (pp. 249-277). Sense publishers.
- Gamede, B. T., & Uleanya, C. (2019). Factors impacting entrepreneurship education in TVET colleges: A case of South Africa. *Journal of Entrepreneurship Education*.
- Giatman, M. (2015). Optimization of implementation QMS ISO 9001: 2008 in the education and training vocational education (TVET) Professional. In *3rd UPI International Conference on Technical and Vocational Education and Training*. Atlantis Press.
- Gird, A., & Bagraim, J. J. (2008). The theory of planned behaviour as predictor of entrepreneurial intent amongst final-year university students. *South african journal of psychology*, 38(4), 711-724.
- Graue, C. (2015). Qualitative data analysis. *International Journal of Sales, Retailing & Marketing*, 4(9), 5-14.
- Gravetter, F. J., & Forzano, L. A. B. (2018). *Research methods for the behavioral sciences*. Cengage Learning.
- Grosch, M. (2017). Developing a competency standard for TVET teacher education in ASEAN countries. *Jurnal Pendidikan Teknologi dan Kejuruan*, 23(3), 279-287.

- Gyamera, G. O., & Burke, P. J. (2018). Neoliberalism and curriculum in higher education: a post-colonial analysis. *Teaching in Higher Education*, 23(4), 450-467.
- Hagos Baraki, A., & van Kemenade, E. (2013). Effectiveness of Technical and Vocational Education and Training (TVET) Insights from Ethiopia's reform. *The TQM Journal*, 25(5), 492-506.
- Harris, R, Simons, M, Hill, D, Smith, D, Pearce, R, Blakeley, J, Choy, S & Snewin, D 2001, *The changing role of staff development for teachers and trainers in vocational education and training*, NCVER, Adelaide.
- Harrison, H., Birks, M., Franklin, R., & Mills, J. (2017, January). Case study research: Foundations and methodological orientations. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 18, No. 1).
- Hassan, B., & Maizam, A. (2017). The Imperatives of Technical Drawing Skills in Teaching TVET Subjects: The Case of Nigeria. *Journal of Education and Practice*, 8(23), 133-135.
- Ismail, K., Nopiah, Z. M., Rasul, M. S., & Leong, P. C. (2017). Malaysian teachers' competency in technical vocational education and training: A review. *Proceeding of Regionalization and Harmonization in TVET—Abdullah et al.(Eds). London: Taylor & Francis Group.*
- Ismail, S., & Mohammed, D. S. (2015). Employability skills in TVET curriculum in Nigeria Federal Universities of Technology. *Procedia-Social and Behavioral Sciences*, 204, 73-80.
- Jones, K. (2013). The role of agricultural technical and vocational education and training in developing countries: A review of literature, issues and recommendations for action. *Harrisburg: The Pennsylvania State University/USAID.*
- Kanwar, A., Balasubramanian, K., & Carr, A. (2019). Changing the TVET paradigm: New models for lifelong learning. *International Journal of Training Research*, 17(sup1), 54-68.
- Kautonen, T., Van Gelderen, M., & Fink, M. (2015). Robustness of the theory of planned behavior in predicting entrepreneurial intentions and actions. *Entrepreneurship theory and practice*, 39(3), 655-674.
- Khasawneh, O. M., Miqdadi, R. M., & Hijazi, A. Y. (2014). Implementing pragmatism and John Dewey's education philosophy in Jordanian public schools. *Journal of International Education Research*, 10(1), 37- 54.
- Kirior, H. (2017). Improving the TVET Curriculum as a Strategy for Better Performance. *Africa Journal of Technical and Vocational Education and Training*, 2(1), 22-30.
- Konayuma, G. S. (2012). A critical discourse analysis of e-learning policies in education and training in Zambia. *MEd, University of Cape Town.*

- Kraak, A., & Paterson, A. (2016). *Change management in TVET colleges: Lessons learnt from the field of practice*. African Minds.
- Kruss, G., & Petersen, I. H. (2018). Responsiveness and employability: An argument for building interactive capabilities in Technical Vocational Education and Training colleges in South Africa.
- Lamb, S. (2011). TVET and the poor: Challenges and possibilities. *International Journal of Training Research*, 9(1-2), 60-71.
- Lamichhane, K. (2017). Teaching students with visual impairments in an inclusive educational setting: A case from Nepal. *International journal of inclusive education*, 21(1), 1-13.
- Lilly, G., & Efajemue, O. O. (2011). Problems of vocational teacher education in Rivers State. In *Nigeria: Proceedings of the 2011 International Conference on Teaching, learning, and Change* (pp. 606-612).
- Liu, H., Liu, M., & Hariyanto, D. (2020). The current state of the TVET teachers' workplace learning in China. In *Journal of Physics: Conference Series* (Vol. 1446, No. 1, p. 012034). IOP Publishing.
- Lowitt, K., Hickey, G. M., Ganpat, W., & Phillip, L. (2015). Linking communities of practice with value chain development in smallholder farming systems. *World Development*, 74, 363-373.
- Lozano, R., Merrill, M. Y., Sammalisto, K., Ceulemans, K., & Lozano, F. J. (2017). Connecting competences and pedagogical approaches for sustainable development in higher education: A literature review and framework proposal. *Sustainability*, 9(10), 1889.
- Lucas, B. Spencer, E. and Claxton, C. *How to Teach Vocational Education: A Theory of Vocational Pedagogy*. London: City & Guilds, 2012.
- Mack, A. J., & White, D. (2019). Challenges Affecting Technical Vocational Education and Training in Trinidad and Tobago: Stakeholders' Perspective. *Journal of Technical Education and Training*, 11(3).
- Mukhtar, M. I., & Ahmad, J. (2015). Assessment for learning: practice in TVET. *Procedia-social and behavioral sciences*, 204, 119-126.
- Margolis, A. A. (2014). The requirements for the modernization of basic professional education program (BPEP) of teachers training in accordance with the professional standard of the teacher: proposals for the implementation of the activity approach in teachers training. *Psychological science and education*, 19(3), 105-126.
- Maree, J. (2017). Africa is rising. Is it producing enough skilled labour? An examination of Technical and Vocational Education and Training (TVET) in Sub-Saharan Africa. *Development and Innovation*.

- Marope, P. T. M., Chakroun, B., & Holmes, K. P. (2015). *Unleashing the potential: Transforming technical and vocational education and training*. UNESCO Publishing.
- Mays, N., & Pope, C. (2020). Quality in qualitative research. *Qualitative research in health care*, 211-233.
- MEF, (2011). Agence Nationale de la Statistique et de la Démographique. Situation économique et sociale du Sénégal, 191 p
- MEFPAI, 2020. Formation professionnelle, de l'Apprentissage et de l'Insertion. <http://www.mefpai.gouv.sn/cartographie-etablissements/> Retrieved 20/1/2020
- Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.
- Ministry of Economy and Finance (2014). General Counting of Population and Housing, Agriculture, and Livestock. Economic and social situation of Senegal. 36p
- MESRI, 2020. Carte universitaire du Sénégal. <http://mesr.gouv.sn/index.php/2019/12/31/situation-de-la-carte-universitaire/> Retrieved 9/3/2020
- Murgor, T. K. (2013). Relationship between Technical and Vocational Acquired Skills and Skills Required in Job Market; Evidence from TVET Institutions, Uasin Gishu County, Kenya. *Journal of Education and Practice*, 4(19), 77-83.
- Musyimi, C. M., Malechwani, J., & Luo, H. (2018). The Belt and Road Initiative and Technical and Vocational Education and Training (TVET) in Kenya: The Kenya-China TVET Project. *Frontiers of Education in China*, 13(3), 346-374.
- Naylor, J. C., Pritchard, R. D., & Ilgen, D. R. (2013). *A theory of behavior in organizations*. Academic Press.
- Ndiaye, A. (2019). *Enjeux de la formation agricole et rurale au Sénégal: Etude sur l'opportunité de la création d'un dispositif dédié à la formation de formateurs*. Éditions universitaires européennes.
- Njenga, M. (2018). Continuing Professional Development for TVET Teachers in Kenya. In *8th Trefort Agoston Conference on Vocational and Higher Education Pedagogy* (pp. 21-22).
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), 1609406917733847.
- Obinnim, E. (2018). The Impact of Competency Models on TVET Instructors in Apparel Pattern Making Processes in Ghana: A Qualitative Study. *Researchers World*, 9(4), 122.
- Odoom, S. K., Payne, E. K., & Boateng, D. A. (2016). Prospects of TVET for Ghana's Industrial Development. *American Journal of Engineering Research*, 5(7), 280-285.

- Ogwo, B. A. (2018). Re-visioning Technical Vocational Education and Training (TVET) for the Youth in sub-Saharan Africa (SSA) and the Sustainable Development Goals (SDGs): Prospects and Promises within the Framework of the Ubuntu Paradigm. In *Re-Visioning Education in Africa* (pp. 155-173). Palgrave Macmillan, Cham.
- Okada, A., Noguera, I., Alexieva, L., Rozeva, A., Kocdar, S., Brouns, F., Ladonlahti, T., Whitelock, D., & Guerrero-Roldán, A. E. (2019). Pedagogical approaches for e-assessment with authentication and authorship verification in Higher Education. *British Journal of Educational Technology*, 50(6), 3264-3282.
- Oketch, M. (2017). Cross-country comparison of TVET systems, practices and policies, and employability of youth in Sub-Saharan Africa¹. *Vocational Education and Training in Sub-Saharan Africa*, 25.
- Oketch, M., & Lolwana, P. (2017). Introduction Keynotes (Vocational Education and Training in Sub-Saharan Africa).
- Oketch, M. (2014). Education policy, vocational training, and the youth in Sub-Saharan Africa. (*WIDER Working Paper No. 2014/069*).
- Okoye, K. R. E., & Chijioke, O. P. (2013). Private-public partnership and technical vocational Education and training (TVET) in a developing economy. *Oman Chapter of Arabian*.
- Okoye, K. R. E., & Okwelle, P. C. (2013). Technical and vocational education and training (TVET) in Nigeria and energy development, marketing and national transformation. *Journal of education and practice*, 4(14), 134-138.
- Okwelle, P., & Ayonmike, C. S. (2014). Towards Value Re-orientation of Youths on the Role of Technical Vocational Education and Training (TVET) for Sustainable Development in Nigeria. *Perspective*, 5(8).
- Omar, M. K., Rashid, A. M., Puad, M. H. M., & Azman, A. H. N. (2018). Fostering interests for teaching: Job satisfaction and motivation factors of Malaysian TVET instructors. *International Journal of Engineering & Technology*, 7(4.9), 46-51.
- Oviawe, J. I., Uwameiye, R., & Uddin, P. S. (2017). Bridging skill gap to meet technical, vocational education and training school-workplace collaboration in the 21st century. *International Journal of vocational education and training research*, 3(1), 7-14.
- Parajuli, M. N. (2013). Rhetoric of developing technical and vocational education and training (TVET) in Nepal: Analyzis of the financing of the sub-sector. *Technical and Vocational Education and Training Development Journal*, 13(1), 58-68.
- Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of retailing and consumer services*, 29, 123-134.
- Patterson, R. R. (2001). Using the theory of planned behavior as a framework for the evaluation of a professional development workshop. *Microbiology education*, 2, 34.
- Patton, M. Q. (2015). *Qualitative research and evaluation methods: Integrating theory and practice* (4th ed.). Los Angeles, CA: Sage.

- Pavlova, M. (2007, October). Two pathways, one destination: TVET for a sustainable future. In *Background paper for the UNESCOUNEVOC virtual conference* (Vol. 22).
- Raihan, M. A. (2014). Collaboration between TVET institutions and industries in Bangladesh to enhance employability skills. *International Journal of Engineering and Technical Research (IJETR)*, 2(10), 50-55.
- Rauch, A., & Hulsink, W. (2015). Putting entrepreneurship education where the intention to act lies: An investigation into the impact of entrepreneurship education on entrepreneurial behavior. *Academy of management learning & education*, 14(2), 187-204
- Republic of Senegal, 2015, Strategic Development Plan for Vocational and Technical Training and Handicrafts (PFTA) 2016-2020.
- Republic of Senegal, (2014a) Diagnosis of Youth Employment in Senegal.
- Republic of Senegal, (2014b). Emerging Senegal Plan.
- Republique du Senegal (2014). Diagnostic sur l'Emploi des Jeunes au Sénégal
- Republique du Senegal (2013). République du Sénégal. *Rue*, 221, 8211683. (2013).
- RGPHAE, (2013). General Census of Population and Housing, Agriculture and Animal Husbandry.
<https://www.sec.gouv.sn/sites/default/files/Rapport%20provisoire%20RGPHAE%20013.pdf> Retrieved 5/1/2019
- Ridzwan, C. R., Malik, S., Hanapi, Z., Mohamed, S., Hussain, M. A., & Shahrudin, S. (2017). Skills and knowledge competency of technical and vocational education and training graduate. *Asian Social Science*, 13(4), 69-77.
- Rogan, M. (2019). Post-school education and the labor market in South Africa.
- Staritz, C., Plank, L., & Morris, M. (2016). Global Value Chains, Industrial Policy, and Sustainable Development—Ethiopia's Apparel Export Sector. *Country Case Study, Geneva: International Centre for Trade and Sustainable Development (ICTSD)*.
- Subedi, R., & Shrestha, M. (2020). Student Friendly Teaching and Learning Environment: Experiences from Technical Vocational Educational Training Schools in Nepal. *European Journal of Educational Technology*, 3(1), 1-13.
- Tafida, S. K., Clement, C. K., & Raihan, M. A. (2015). Determining the causes for the exodus of technical teachers from teaching in technical and vocational institutions to other jobs in Katsina State, Nigeria. *International Journal of Vocational and Technical Education*, 7(2), 14-19.
- Takyi-Amoako, E. J., (2018). Re-visioning education in Africa: Ubuntu-inspired education for humanity. Springer (Ed.).

- UNESCO. International Centre for Technical and Vocational Education and Training (UNESCO-UNEVOC). (1989). Convention on technical and vocational education. Adopted by the General Conference of UNESCO at its twenty-fifth session Paris, 10 November 1989
- Unsworth, K. L., Dmitrieva, A., & Adriasola, E. (2013). Changing behaviour: Increasing the effectiveness of workplace interventions in creating pro-environmental behaviour change. *Journal of Organizational Behavior*, *34*(2), 211-229.
- Usman, A. S., & Tasmin, R. (2015). Entrepreneurial skills development strategies through the mandatory students' industrial work experience scheme in Nigeria. *Procedia-Social and Behavioral Sciences*, *204*, 254-258.
- van Halsema, W. (2017). Competence and TVET Innovation in Sub-Saharan Africa: The Case of Rwanda. In *Competence-based Vocational and Professional Education* (pp. 487-504). Springer, Cham.
- Wrana, J., & Nguyen, T. X. T. (2019). 'Strategic coupling and regional development in a transition economy: what can we learn from Vietnam?'. *Area Development and Policy*, *4*(4), 454-465
- WEI, F. J., & Jamil, H. (2019). TVET Educational Choice of Malaysian Polytechnic Students (Pilihan Pendidikan TVET Pelajar Politeknik di Malaysia). *Jurnal Pendidikan Malaysia (Malaysian Journal of Education)*, *44*(1), 65-76.
- Yin, R. K. (2009). *Case study research: Design and methods* (fourth ed. Vol. 5). Thousand Oaks: Sage.
- Yin, R. K. (2003a). *Case study research: Design and methods* (third ed. Vol. 5). Thousand Oaks: Sage.
- Yin, R. K. (2003b). *Application of Case Study Research* (second ed. Vol. 34). Thousand Oaks: Sage.

Appendix

Appendix A: French Interview protocole

IRB -- 20-993

Protocole d'interview

Comment les programmes d'enseignement technique et professionnel agricole au Sénégal doivent-ils être améliorés pour répondre aux besoins changeants des différentes chaînes de valeur au sein du système agricole au Sénégal?

Questions d'interview aux participants

1. Comment décrivez-vous vos expériences d'enseignement et d'apprentissage dans le système d'EFTP?
2. Quels sont les objectifs du programme et comment sont-ils liés à l'école dans son ensemble?
 - Comment les enseignants peuvent-ils être mieux soutenus pour atteindre les objectifs d'amélioration du programme?
 - Quelles sont les caractéristiques générales de votre programme qui intègrent l'enseignement universitaire et professionnel?
3. Le programme du cours détermine actuellement ce que vous enseignez. De quelle souplesse disposez-vous pour inclure un sujet qui permettra à vos élèves de respecter les normes selon lesquelles les réalisations et les progrès sont mesurés pour tout domaine ou domaine d'apprentissage clé?
 - Si vous enseignez l'agriculture, quels sujets abordez-vous en classe? Quelles ressources utilisez-vous? Si ce n'est pas le cas, pourquoi pas?
 - Quels critères appliquez-vous lors du choix du contenu pour répondre au programme?
 - D'où vous procurez-vous de nouvelles informations / ressources / stratégies d'enseignement pour vous aider dans votre classe?
 - Le programme est-il conforme aux critères de qualité appropriés, tels que les exigences d'obtention du diplôme ou les normes de compétences académiques ou industrielles en agriculture? Les programmes d'EFTP sont-ils clairement alignés sur vos normes professionnelles?
 - Le programme est-il adéquat pour garantir la compétence de niveau d'entrée?
 - Le programme d'agriculture aide-t-il les élèves à voir la valeur de ce qu'ils apprennent et sa pertinence dans leur vie, leur présent et leur avenir?
 - Le contenu, les activités et les évaluations des cours développent-ils explicitement les compétences, la compréhension et les connaissances?
 - Les programmes agricoles réussissent-ils à équilibrer le développement progressif des connaissances et des compétences avec les exigences du marché du travail?
 - Les programmes agricoles permettent-ils aux apprenants de réaliser des activités de qualité dans le monde du travail?
4. Comment décrivez-vous vos pratiques pédagogiques?

- Quelles pratiques ou stratégies d'enseignement utilisez-vous dans votre classe? Quels types d'activités les élèves s'engagent-ils dans votre classe?
 - Comment décrivez-vous la qualité de vos pratiques pédagogiques?
 - Y a-t-il des relations entre la pratique de l'enseignement et les résultats d'apprentissage des élèves? Expliquez?
5. Comment les activités des élèves améliorent-elles l'apprentissage contextualisé / appliqué des matières académiques et professionnelles?
6. Qu'est-ce que les élèves apprennent dans ces programmes?
- Comment mesurez-vous les résultats ou l'apprentissage des élèves?
 - Quels types de données sur le rendement des élèves sont collectés et comment sont-ils utilisés? Quelle est la qualité du travail qu'ils produisent?
7. À quels types d'activités de formation des enseignants avez-vous participé pour soutenir votre enseignement?
8. Comment les opportunités de formation professionnelle continue contribuent-elles à votre expérience dans votre fonction dans les écoles agricoles de l'EFTP?
- À quels types d'activités de développement des enseignants vous êtes-vous engagé pour soutenir votre enseignement?
 - De quels types de soutien supplémentaire avez-vous besoin dans les pratiques d'enseignement?
 - Les activités améliorent-elles l'apprentissage contextualisé / appliqué des matières académiques et professionnelles? S'il vous plaît, expliquez.
 - Dans quels domaines vous sentez-vous moins soutenu / plus soutenu?
9. Comment décrivez-vous le financement et l'infrastructure de l'EFTP dans votre école?
10. Que pensez-vous de la pertinence pour le marché du travail des programmes actuels?

Appendix B: Interview protocol

Interview Protocol IRB – 20-993

How must agricultural technical education and vocational programs in Senegal be improved to address the changing needs of the different value-chains within Senegal's agriculture system?

Interview questions with the Participants

1. How do you describe your experiences in teaching and learning in the TVET system?
2. What are the goals of the program and how do they relate to the school as a whole?
 - How can teachers be better supported to achieve program improvement goals?
 - What are the general characteristics of your program that integrate academic and vocational education?
 -
3. The course curriculum currently determines what you teach. How much flexibility do you have to include any topic that will allow your students to meet the standards by which achievement and progress are measured for any domain or key learning area?
 - If you do teach about agriculture, what topics do you cover in the classroom?
What resources do you use?
 - If you don't, why not?
 - What criteria do you apply when choosing content to meet the curriculum?
 - From where do you source new information/resources/teaching strategies to assist you in your classroom?
 - Does the curriculum align with appropriate quality benchmarks, such as graduation requirements or academic or industry skill standards in agriculture? Are the TVET curricula clearly aligned with your occupational standards?
 - Is the curriculum adequate to ensure entry-level competence?
 - Is the agriculture program helping students to see the value of what they are learning and its relevance to their lives, present, and future?
 - Do course contents, activities, and assessments explicitly develop the skills, understanding, and knowledge?
 - Do the agriculture programs successfully balance the progressive development of knowledge and skills with labor-market requirements?
 - Do the agriculture programs enable learners to perform quality activities in the world of work?
 -

-
- 4. How do you describe your instructional practices?
 - What teaching practices or strategies are you using in your class? What kinds of activities do students engage in your class?
 - How do you describe the quality of your instructional practices?
 - Are there relationships between teaching practice and student learning outcomes? Explain?
- 5. How do the student activities enhance contextualized/applied learning of academic and vocational subject matter?
- 6. What do students learn in these programs?
 - How do you measure student outcomes or learning?
 - What kinds of student performance data are collected and how are they used? What is the quality of the work they produce?
- 7. What kinds of teacher development activities have you engaged in to support your teaching?
- 8. How do continuing professional education opportunities contribute to your experience in your position in the TVET Agricultural Schools?
 - What kinds of teacher development activities have you engaged in to support your teaching?
 - What kinds of further support do you need in teaching practices?
 - Do the activities enhance contextualized/applied learning of academic and vocational subject matter? Please explain.
 -
 - In what areas do you feel less supported/more supported?
- 9. How do you describe the TVET funding and infrastructure in your school?
- 10. What do you think about the relevance to the labor market of the current programs?

Appendix C: Script of conversation

IRB -- 20-993

Script of the conversation with the teachers

Hello sir madam

I want to invite you to participate in this study on EFPT and the teaching methods you use to improve training quality. I'm doing this research for the University of Virginia Tech. I am writing to invite you to participate in my project entitled "How should agricultural technical and vocational education programs in Senegal be improved to meet the changing needs of the different value chains within the agricultural system in Senegal?". Improving the quality of training offers a better understanding of integration into the labor market for students. Indeed, this study will allow knowledge of Pedagogical techniques, and your participation is more than essential. As teachers, you have an experience that will enable us to obtain relevant data on this subject. Aside from this possible individual and personal benefit, we do not see any other benefits for participants. However, the results of this research will offer the possibility of helping others who will be in the same situation as you in the future.

Appendix D: French Script

IRB -- 20-993

Script de conversation avec les enseignants

Bonjour Monsieur, Madame

Je voudrai vous inviter à participer dans cette étude sur EFPT et sur les méthodes pédagogiques que vous utilisez pour améliorer la qualité de la formation. Je mène cette recherche pour l'Université de Virginia Tech. Je vous écris pour vous inviter à participer à mon projet intitulé Comment les programmes d'enseignement technique et professionnel agricole au Sénégal doivent-ils être améliorés pour répondre aux besoins changeants des différentes chaînes de valeur au sein du système agricole au Sénégal?». L'amélioration de qualité de la formation offre la possibilité de mieux saisir le processus d'intégration sur le marché du travail pour les étudiants. En effet, cette étude va permettre une compréhension des techniques Pédagogiques et votre participation est plus qu'importants. En tant que enseignants, vous avez une expérience qui va nous permettre d'obtenir des données pertinentes sur ce sujet. Mis à part cet éventuel bénéfice individuel et personnel, nous ne percevons pas d'autres avantages pour les participants. Par contre, les résultats de cette recherche offriront la possibilité d'aider d'autres personnes qui seront dans la même situation que vous dans le futur.

Appendix E: Consent to participate

Protocol #__ IRB -- 20-993__

Principal Investigator Name and Contact Information__ [Donna Marie Westfall-Rudd \(Faculty\)](mailto:mooredm@vt.edu)
mooredm@vt.edu _____

Additional COVID-19 Information Related to Consent to Participate in In-Person Research at Virginia Tech

You have agreed to participate in a research study at Virginia Tech. The research study involves in-person contact or procedures. Here are some things you should know about in-person research while COVID-19 remains a risk:

Risks related to COVID-19:

If you choose to participate in this study, the risk for COVID-19 are about the same as those posed by similar activities while the virus is still spreading in your community. Similar activities could include grocery shopping, having your car repaired, or getting a haircut.

In addition, participation might increase risk to your family, the community, and the research team.

You should not participate if you have any conditions or risk factors that could make a COVID-19 infection more serious. Risk factors for severe illness include having other medical conditions such as asthma, diabetes, heart problems, or any other illness. Certain populations might also be at increased risk or unknown risk, including people aged 65 and older, people with disabilities, women who are pregnant or breastfeeding, people who are experiencing homelessness, and people who are part of racial and ethnic minority groups.

The information on people who need to take extra precautions is being updated regularly. We encourage you to check for the latest information before you decide whether to participate. Please visit <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/index.html> for the most up to date information.

What we are doing to reduce risk to you:

Each study has developed a process for conducting the research as safely as possible, given current knowledge about COVID-19. This process has been reviewed by the Human Research Protection Program at Virginia Tech. You will be given a sheet with information specific to your study. You should review this information and ask any questions before you agree to participate.

We will not conduct the study during times of increasing community spread or if we cannot obtain the necessary disinfecting supplies and equipment to reduce the risk of exposure.

Everyone working on the study has been instructed to stay home if they have any symptoms that could be related to COVID-19. If someone on the research team tests positive for COVID-19 and you have been exposed, someone will notify you. We will maintain a contact tracing log that is separate from your data and other details about your participation, and we will provide this log to the New River Health District (540 267-8240) who will conduct contact tracing in the case of a positive test. We will destroy this log 60 days after your last visit.

Protocol #__ IRB -- 20-993__

Principal Investigator Name and Contact Information__ [Donna Marie Westfall-Rudd \(Faculty\)](mailto:mooredm@vt.edu)
mooredm@vt.edu _____

What you can do to reduce risk to us and to the community:

Do not participate if you have had any symptoms of COVID-19 in the past 14 days or have been in contact with someone who has symptoms. Symptoms include, but are not limited to, cough, shortness of breath or difficulty breathing, fever, chill, repeated shaking with chills, muscle pain, headache, sore throat, and new loss of taste or smell.

Do not participate if you have tested positive for COVID-19 in the past 21 days, even if you have not shown any symptoms.

Do not participate if you know you have been exposed to anyone who has tested positive for COVID-19 in the past 21 days.

Let us know if you test positive for COVID-19 within the next 14 days. We will provide your contact tracing log to university or public health authorities who will use the tracing log to contact others who may have been exposed during your visit.

Wash your hands frequently and observe current guidance on avoiding virus spread from the Centers for Disease Control.

Wear a mask or a cloth face covering over your nose and mouth. Depending on the study, another method may be used, such as physical distancing, a face shield, or Plexiglas barrier.

For the latest information on COVID-19 please visit: <https://www.cdc.gov/coronavirus/2019-ncov/index.html>

Signature Block

Your signature documents that you have read and understand the information outlined in this document and all of your questions have been answered. We will provide you with a signed copy of this consent addendum for your records.

Signature of subject

Date

Printed name of subject

Signature of person obtaining consent

Date

Printed name of person obtaining consent