

1 **From asking “Would I be ready?” to “Would I belong?”: Preparedness**
2 **perceptions of Forest and Natural Resources university students in the United**
3 **States to enter the workforce.**

4
5 Authors: Kamana Chamlagain¹, Pipiet Larasatie^{2*}, Elena Rubino¹, and Shanna Knowles^{1,3}

6 ¹ Arkansas Center for Forest Business, College of Forestry, Agriculture & Natural Resources,
7 University of Arkansas at Monticello, Monticello, Arkansas, USA

8 ² Department of Sustainable Biomaterials, College of Natural Resources and Environment,
9 Virginia Tech, Blacksburg, Virginia, USA

10 ³ School of Business, University of Arkansas at Monticello, Monticello, Arkansas, USA

11 * Corresponding author

12 **Abstract**

13 Despite its economic contribution, the forest and related natural resource (FNR) sector in the
14 U.S. faces significant challenges, which higher education has been instrumental in overcoming.

15 This study aims to investigate the patterns of entry of university students into the FNR
16 workforce, with a focus on their perceptions of preparedness to enter the workforce. We
17 followed the perceived fit theory as a framework to model students' preparedness.

18 Based on survey results, we found students chose “analysis, synthesis, and critical skills” as their
19 highest level of competency development. However, within the same measurement, the recruiters
20 placed significantly high importance on “responsibility and perseverance” competency. We
21 discuss the differences in perceptions between Gen X recruiters and Gen Z students from

22 generational perspectives in the workplace. Furthermore, we highlight the broader competency
23 units that these students and recruiters have selected. Theoretically, “analysis, synthesis, and
24 critical skills” and “responsibility and perseverance” are grouped into "lifelong learning."
25 However, despite lifelong learning being considered essential for cultivating a versatile,
26 adaptive, and employable workforce, further analysis reveals a significant negative correlation
27 between students' lifelong learning competencies and their perceived preparedness for entering
28 the workforce. The significant negative correlation is also found on student respondents who
29 identified themselves as Black, or woman, or other gender identity, suggesting the less sense of
30 belonging. Leaders of the FNR program could facilitate chances for students to articulate their
31 experiences of belonging, through mentorship or networking based on shared social identities or
32 life stages.

33 **Keywords**

34 Perceived student preparedness; workforce entry; gen Y students; gen X recruiters; lifelong
35 learning; sense of belonging.

36 **1. Introduction**

37 In the United States, the forest industry is a major contributor to the economy. By
38 employing 3.4 million people and generating \$256 billion in labor income, the sector contributes
39 \$427.3 billion which is about 1.8% to the country's GDP (Arkansas Center for Forest Business,
40 2023). Despite this economic contribution, the forest and related natural resource (FNR) sector in
41 the U.S. is now facing significant challenges in attracting young and diverse talent (Larasatie et
42 al., 2019; 2020a; 2020b) and securing a trained and proficient workforce across all levels (Forest
43 Resources Association, 2023).

44 The U.S. private forest sector workforce, which includes forestry and logging operations,
45 wood product manufacturing, and paper manufacturing industries, has experienced an overall
46 decrease of 27% between 2005 and 2010 (Korhonen et al., 2024). Specifically, the logging and
47 forestry sectors have experienced a 40% decline, paper manufacturing has seen a 27% decline,
48 and wood product manufacturing has declined by 24%. Declining employment is also found in
49 the public forest sector. An analysis from USDA Forest Service employment data from 1995 to
50 2017 showed that the total number of employees decreased by approximately 20% (Westphal et
51 al., 2022).

52 The human resource crisis is fueled by retiring professionals and a limited pool of young
53 adults interested in filling vacancies. Several higher education case studies indicate a general
54 decline in student enrollment in FNR majors and interest in FNR careers (e.g., Bal et al., 2020).
55 Rouleau et al. (2017) reveals substantial disparities in enrollment decision-making between
56 majority and minority students in FNR disciplines within U.S. higher education institutions. For
57 instance, women exhibited somewhat more reluctance to participate in a forestry or wood science
58 program compared to men, who constitute the predominant demography of FNR students
59 (USDA Food and Agricultural Education Information System, 2022). Women and minorities
60 also perceive a significantly low fit in the FNR sector due to their underrepresentation (Korhonen
61 et al., 2024).

62 The lack of interest in forestry careers poses a barrier not only for minority groups but
63 also impacts the majority (Sharik et al., 2015). White male students express significant deterrents
64 such as a perceived scarcity of employment opportunities and lower salaries relative to other
65 professions (Bal et al., 2020; Rouleau et al., 2017).

66 The composition of FNR programs in higher education settings has changed dramatically.
67 The Forestry program constituted half of all the Natural Resources enrollment in the 1980s, now
68 represents only 15% of the student population (Sharik et al., 2015). Today, the field is dominated
69 by Natural Resource Conservation and Management combined with Environmental Science and
70 Studies. Most of the growth in these interdisciplinary areas comes from women and minorities,
71 such that they now make up a much larger proportion of enrollment than is the case with forestry
72 (e.g., UBC Faculty of Forestry et al., 2021). At the graduate level, enrollment in forestry and
73 related disciplines has declined since 2010, with the exception of natural resource conservation
74 and management (Sharik et al., 2015). Declining graduate enrollment raises concerns about the
75 long-term availability of highly trained professionals.

76 The U.S. Forest sector has a high proportion of older workers (Korhonen et al., 2024;
77 Lawrence et al., 2017), with 40-60 % of young adults who are estimated to leave rural economies
78 dependent on forest resources, for other employment prospects (Forest Resources Association,
79 2023). Similar patterns have emerged from the U.S. logging workforce. More than 75% of
80 logging firm owners are older than 40 years old, the average age of mill owners/operators is 55
81 years old, and around 30% of them are intending to exit the business within the next five years
82 (Forest Resources Association, 2023).

83 In addition to workforce aging problems, the FNR sector in the United States also has
84 significant disparities in gender and race diversity across industries, jobs, and ownership
85 structures (Korhonen et al., 2024), which signals a limited pool of participants of people from
86 different backgrounds. Men have traditionally dominated the forestry industry (Larasatie et al.,
87 2019), making up over 80% of foresters in the U.S. today (Wagner, 2022). Society of American
88 Foresters, currently the largest professional society of foresters in the U.S., noted that only 16%

89 of forestry and conservation professionals are women (Project Learning Tree, 2019). The gender
90 disparity is not only seen in the industry but also in forest related higher education (Bal et al.,
91 2020; Larasatie et al., 2020a, 2020b; UBC Faculty of Forestry et al., 2021).

92 The gender gap in forestry extends beyond the United States and is also a global
93 limitation. In the global forest industry, women represent only 16% of positions on boards of
94 directors among Producer Price Index Top 100 companies, with fewer in their top management
95 teams (Lawrence et al., 2017). Moreover, women and underrepresented groups face more
96 challenges in the FNR sector compared to their male colleagues. For instance, they are more
97 likely to experience harassment, gender-based discrimination, lower job satisfaction, and limited
98 career opportunities (e.g., Johansson et al., 2019; Larasatie et al., 2023; 2022).

99 Racial diversity is also severely lacking in the FNR sector in the United States, including
100 the broader forestry-related industries (forestry & logging, wood product manufacturing, and
101 paper manufacturing), where minorities are underrepresented across various job categories,
102 including professionals and executives (EEOC, 2022). According to U.S. Census data, African
103 Americans comprise less than 3% of foresters and conservation scientists, highlighting a
104 significant underrepresentation in the field (Sustainable Forestry Initiative, 2022). The lack of
105 racial diversity in forestry is also evident in government agencies. The U.S. Forest Service
106 employs a higher proportion of white staff compared to the overall US population (Locke et al.,
107 2023). Its racial and ethnic diversity falls below the surrounding communities at 99.7% of its
108 workplaces.

109 To meet the rising FNR workforce challenges, universities have played a significant role
110 by providing evolving education and training (Larasatie et al., 2024; Rodríguez-Piñeros et al.,
111 2020), serving as both a driver of change and a response to FNR sector needs (Sharik et al.,

112 2020). With a good education, students are equipped with the necessary knowledge, skills, and
113 behaviors for growing professional responsibilities (Rodríguez-Piñeros et al., 2020; Sample et
114 al., 2015).

115 Globally, FNR education has undergone significant changes shifting from a resource-
116 centered approach to a more integrated approach as new employment areas beyond traditional
117 forestry are gaining importance (European Forest Institute, 2021). The new approach includes
118 linking environmental science and considering FNR resources and values beyond timber
119 (Sheppard et al., 2020). Additionally, the gaps between university competencies and job market
120 demands are identified in some region and countries such as North America, Europe, China,
121 Brazil, and Kenya (Rekola & Sharik, 2022). To address these challenges, many countries have
122 modernized forestry education. In Europe, the Bologna Process has driven substantial reforms,
123 fostering competency-based learning and outcome-oriented training (Larasatie et al., 2024;
124 Rekola et al., 2021). Similarly, in United States, universities have adopted flexible programs
125 combining online training with hands-on field practice (Larasatie et al., 2024).

126 To better understand the interlink between higher education and workforce development,
127 this study uses perceived fit theory to investigate the patterns of entry of university students in
128 FNR workforce (Kristof-Brown et al., 2005). Some applications of the perceived fit theory in
129 workplace settings include its use as a key factor to evaluate and maximize the efficacy of
130 activity-based work environments in relation to individual behavior (Hoendervanger et al., 2022)
131 and to evaluate individuals' perceptions of their fit within organizations, showing that higher
132 perceived fit correlates to better work performance and organizational commitment (Chuang et
133 al., 2016).

134 The aim of the study is to investigate the patterns of entry of university students majoring
135 in FNR. To meet our objective, we focus on the perceptions of FNR students on their
136 preparedness to enter the workforce based on their educational background, development of
137 professional competencies in universities, as well as individual sociodemographic characteristics.
138 Additionally, we contrast students' perceived professional preparedness against recruiters'
139 perceived importance of these professional competencies. By better understanding of the patterns
140 of entry of FNR university students to employment, this study can contribute to answering the
141 FNR workforce challenges by contributing to the FNR academic institutions and industrial
142 sectors' efforts to facilitate inclusive entry for new graduates into the FNR workforce.

143 **2. Theoretical Background: Perceived fit theory and forest and** 144 **related natural resource (FNR) sector**

145 2.1. Patterns of entry

146 We use the term "patterns of entry" to refer to recurring observations on university
147 students' entrance into the FNR workforce. Upon graduating from school, it is anticipated that
148 young individuals will join the workforce. The overwhelming majority do so; however
149 numerous entry patterns exist.

150 The diverse entry patterns are influenced by age and educational qualifications at the time
151 of entry, as well as the prevailing economic conditions (Kerckhoff, 2003). Generally, older
152 individuals and those with advanced educational qualifications experience more seamless
153 transitions into the labor market. Younger individuals with lower levels of education are more
154 prone to encountering challenges in securing employment. This is particularly probable in a
155 weak economy with elevated unemployment rates (Arum & Hout, 1998).

156 2.2. Perceived fit theory

157 We ground this investigation in perceived fit theory, which refers to the compatibility
158 between an individual and their working environment. Perceived fit ends with positive results
159 like satisfaction and performance if there is fit between work environments, activities, and
160 employees' personal requirements (Kristof-Brown et al., 2005). If there is a perceived mismatch
161 between personal needs and the work environment, dissatisfaction arises. The theory offers
162 understanding of how individuals interact with and adapt to their working environment over
163 time. (Kristof-Brown et al., 2005).

164 In the FNR context, this theory can help to explain why students are more interested in
165 entering certain work organizations or sub-sectors within the broader FNR field just after their
166 graduation (Sharik et al., 2015). The application of perceived fit theory to university students
167 entering the FNR sector relates how well students believe their interest, skills, abilities, and
168 values align with the demands and culture of this field. Since individuals are more likely to
169 choose and thrive in environments that match their personal characteristics (Kristof-Brown &
170 Guay, 2011), higher perceived fit is directly related to increased enrollment and pursuit of
171 careers in FNR (Sharik et al., 2015).

172 There are several factors that may influence students' perceived fit in the FNR sector
173 which include career expectations and perceptions of work-life (Bullard et al., 2014), value
174 congruence especially regarding environmental conservation and sustainability management
175 (Rouleau et al., 2017), and technical and interpersonal skills suited more to this field (Sample et
176 al., 2015). Some students are unaware about the diverse career paths in the FNR sector and
177 possess misconceptions which may lead them to lower perceived fit in this field, addressing

178 these issues improves the perception and attract more diverse individuals to FNR workforce
179 (Balcarczyk et al., 2015).

180 Demographic factors can also influence perceived fit; for instance, women and minorities
181 may perceive a significantly lower fit due to their underrepresentation in the FNR sector
182 (Korhonen et al., 2024). Therefore, to improve students perceived fit, universities and industry
183 stakeholders have been offered varied FNR programs along with internships and field
184 experiences (Sample et al., 2015). These opportunities show a diverse range of job opportunities
185 in the sector, providing accurate information about the career opportunities and workplace
186 culture (Bullard et al., 2014).

187 2.3. Perceived preparedness

188 Perceived preparedness relates to self-assessed readiness of students' and professionals to
189 enter and succeed in their career based on their education, skills, and experiences (Wasserman,
190 2010). This includes their evaluation of their own knowledge, skills, and abilities in relation to
191 the demands and challenges of their jobs. People who feel well-prepared (high perceived
192 preparedness) usually feel a higher perceived fit for their professions (Wasserman, 2010).

193 Higher perceived preparedness is often associated with participation in internships,
194 fieldwork, and hands-on learning experiences, which enhance confidence and competence in the
195 field (Kristof-Brown et al., 2005; Sample et al., 2015). Practical exposure allows individuals to
196 apply theoretical knowledge in real-world scenarios, helping them develop technical and
197 interpersonal skills needed for career success.

198 2.4. Competency

199 Competency is defined as an individual's ability to perform a task integrating their
200 knowledge, education, skills, and experience (Herringer, 2002). Competences can be subject-
201 specific, such as related to FNR based knowledge and skills including ecological, technological
202 and socio-economical aspects of forests and forestry, and generic skills such as literacy and
203 numeracy, communication, teamwork and leadership (Rekola & Sharik, 2022). In the FNR
204 sector, competency encompasses both technical and soft skills required for successful
205 employment. Technical competencies include knowledge of ecological systems, resource
206 management, and geospatial analysis, while soft skills such as teamwork, communication, and
207 leadership are equally critical (Bullard et al., 2014).

208 For a successful entry into the workforce, (Martínez-Clares & González-Lorente, 2019)
209 introduced professional competencies which includes both personal and interpersonal
210 competencies as a key element in bridging the gap between higher education and the professional
211 world. Personal competencies are the skills, behaviors, and characteristics that enable an
212 individual to perform effectively in diverse professional and organizational settings (Bakhru,
213 2017). These competencies include self-management, adaptability, communication, problem-
214 solving, teamwork, and the ability to learn and grow in the workplace (Civelli, 1998).

215 On other hand, interpersonal competencies are the skills related to working effectively with
216 others which include communication (both oral and written), teamwork, leadership, conflict
217 resolution, and cultural competence (Martínez-Clares & González-Lorente, 2019). Strong
218 interpersonal skills are crucial for professional success in fields like forestry and natural
219 resources, where collaboration among scientists, policymakers, landowners, and the public is
220 required.

221 Although professional competencies are crucial for a successful transition into the job
222 market, research highlights a mismatch between competency profiles demanded by employers'
223 and those developed by new graduates (e.g., Gibbs et al., 2011). Employers often look for
224 applicants with well-developed interpersonal skills, yet graduates mostly possess technical
225 expertise while lacking communication, teamwork and leadership skills (Jackson, 2016). To
226 solve this mismatch, higher education must manage students' employability through actions
227 encouraging personal and interpersonal competencies development among its students (Bullard
228 et al., 2014; Martínez-Clares & González-Lorente, 2019). All efforts must be made to provide
229 university students with quality training that gives them the skills to choose the best career path
230 for their higher education.

231 2.5. Generational theory

232 The most well-known generational theory proposed by Mannheim & Keeskemeti (1952)
233 suggests that individuals brought up in the same historical context share collective experiences
234 that distinctly influence their attitudes, behaviors, and values across different age groups.
235 Younger generations integrate these fundamental sociological and economic changes as part of
236 their natural worldview, in contrast to older generations, who perceive them as shift from
237 established norms. Strauss & Howe (1991) categorize these generations as Baby Boomers,
238 Generation X, Millennials, and Generation Z.

239 Majority of workers' attitudes and decisions regarding work evolve with life stages: young
240 employees adapt to new work realities with issues related to inexperience, middle-aged workers
241 balance family responsibilities, and older workers navigate retirement decisions, career
242 reflection, and health concerns (Fenzel, 2013). However, these life cycle differences are often

243 mistaken for generational differences influencing how different age groups perceive each other
244 in the workplace (Levenson, 2010).

245 In the Forestry and Natural Resources (FNR) sector, generational theories have been used to
246 analyze the workforce trend (Kovacs, 2021), and to understand recruitment challenges,
247 workforce retention, and career motivations across diverse age groups (Westerman &
248 Yamamura, 2007). However, generation theory provides a framework to make the future
249 intelligible, it has significant limitations that may hinder effective and just responses to
250 challenges like climate change (White, 2018). For example, research suggest that younger
251 generations are more attracted towards environmental protection and sustainability compared to
252 old generation (Li et al., 2023).

253 2.5.1. Criticism of Generational Theories

254 A major criticism of generation theory is the assumptions that individuals within the same
255 generational cohort share homogeneous values, behaviors, and work attitudes (Mannheim &
256 Keeskemeti, 1952). While foundation theories such as the theory of generations (Mannheim &
257 Keeskemeti, 1952) and social identity theory (Tajfel & Turner, 1986) emphasize the importance
258 of generational differences in the workplace, recent studies challenge these broad generalizations
259 (Mahmoud et al., 2021; Rudolph & Zacher, 2016). Rudolph & Zacher (2016), for example, argue
260 that generational differences have negligible impact on work processes and outcomes, suggesting
261 that factors like socioeconomic background, education, and personal experiences are more
262 consequential than generational identity.

263 Furthermore, generational classifications frequently rely on arbitrary age ranges rather than
264 significant differences in workforce behavior. Some researchers propose that factors such as
265 technological nativity may be more important in understanding workplace dynamics than

266 traditional generational groupings (Mahmoud et al., 2022). Despite this, age-defined cohorts
267 such as Baby Boomers, Generation X, Millennials, and Generation Z remain common in research
268 and workforce management (Dimock, 2019). This rigid classification may overlook the diverse
269 experiences within each generation, potentially resulting in misleading conclusions in FNR
270 workforce research.

271 2.6. The Sense of Belonging

272 The term “sense of belonging” refers to a feeling of connectedness, the belief that one is
273 significant or valued by others (Rosenberg & McCullough, 1981). Baumeister & Leary (1995)
274 argue that humans possess an inherent desire to form and sustain meaningful interpersonal
275 relationships, regardless of the social or institutional context, as a basic need, such as food or
276 safety.

277 In educational and professional settings, a strong correlation exists between belonging and
278 high levels of engagement. An increased sense of belonging leads to collaboration, problem
279 solving, and better decision making (Trisca, 2025). Individuals are more likely to share ideas,
280 confidently speak up, and fully contribute to organization’s success when they feel a sense of
281 belonging. In the FNR context, it helps us to understand how students and professionals interact
282 with the field, choose careers, and maintain long-term commitment.

283 Belonging has long been acknowledged as a crucial component of student success in an
284 educational setting. Strayhorn (2018) defined a sense of belonging as a student’s perceived social
285 support, a feeling of connectedness, and the experience of being appreciated, accepted,
286 respected, and valued by the campus community. A strong sense of belonging has been
287 consistently linked to academic motivation, success, persistence, and a range of positive

288 outcomes, including supportive social relationships, occupational success, and better physical
289 and mental health (Allen et al., 2021; Vaccaro & Newman, 2016).

290 Allen (2021) further conceptualizes belonging as a dynamic feeling and evolving experience
291 emerging from the interaction of four interrelated components: competencies, opportunities,
292 motivations, and perceptions. These four interrelated components dynamically interact and
293 influence one another, shifting, evolving, and adapting across time, social, and environmental
294 contexts and experiences, reflecting that belonging is not a fixed state but a fluid and responsive
295 process.

296 3. Methods

297 This survey is part of a larger project about the Forest and Natural Resources (FNR)
298 workforce analysis, targeting students, employees, and recruiters (Larasatie, 2025). For the
299 purposes of this particular article, we focus specifically on the student sample, but comparisons
300 between students and recruiters (employers) are also performed to provide additional context on
301 the expectations of the future workforce in terms of skills.

302 The survey was designed to understand students' patterns of entry to the workforce.
303 Accordingly, we asked students to evaluate their perceived preparedness to enter the workforce.
304 As specified in the Theoretical Background, we followed the Perceived Fit Theory (Kristof-
305 Brown et al., 2005) as a framework to model students' "perceived preparedness". Under this
306 framework, we assume that a student will assess their own level of preparedness based on a
307 combination of educational background, development of professional competencies, and
308 sociodemographic characteristics (e.g., Hendrix and Morrison, 2018; Malau-Aduli et al., 2022).
309 In other words, students will evaluate how well their professional and personal profile align with

310 the expectations of the workforce. Specifically, students were asked the question “Do you feel
311 prepared to meet the demands of entering the labor market?” Responses were recorded using a
312 five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). An “I don’t
313 know” response option was also offered but excluded from this analysis.

314 To control factors that could influence this response, the survey also included questions
315 about their educational background (e.g., degree level, field of study, and extracurricular
316 activities), development of professional competencies, and demographic characteristics (e.g.,
317 age, race and ethnic background, gender identity, and sexual orientation). To measure the
318 development of professional competencies, students were asked “Does the educational training
319 you are receiving help you develop the following skills?” This question was followed by a
320 comprehensive scale of 19 personal and interpersonal competencies proposed by Martinez-
321 Clares and Gonzalez-Lorente (2019), which are considered important for a successful entry into
322 the labor market (Table 1). These 19 elements were grouped into five units of competency:
323 adapting to change, lifelong learning, ethical social commitment, personal identity, and initiative.
324 Cronbach’s alpha test of internal consistency was used to measure how closely related the items
325 within each of the five units were. The reliability coefficients of 0.7 indicate an acceptable
326 reliability of the groupings.

327 The same 19-item scale was also presented to recruiters from forest-related associations
328 to understand the demand side for these skills. The exact question presented to recruiters was
329 “Do you agree or disagree that the potential employees need to possess these skills?”. To ensure
330 consistency in respondents’ understanding of the meaning of each competency, we provided a
331 definition for each item within the survey. Responses were recorded using a five-point Likert
332 scale, ranging from 1 (strongly disagree) to 5 (strongly agree). An “I don’t know” response

333 option was also offered but excluded from this analysis. We computed the means from the
334 Likert-scales and compared students versus recruiters' ratings using the Wilcoxon rank-sum test.
335 Table 1. Professional competencies measured in the survey of forest and natural resources university
336 students.

Professional Competency and Definition

Adapting to change

- 1. Planning and organization skills:** Define priorities in the accomplishment of tasks, establishing plans of action by means of the optimal use of time, means and resources
- 2. Flexibility and orientation to change:** Ability to understand and appreciate different perspectives of a situation, to adapt and work effectively
- 3. Motivation for achievement:** Desire to establish and carry out own objectives, based on the contrast of who I am and what I can contribute in a professional way to reach the set goals
- 4. Decision-making:** Related to work autonomously, involves the identification and analysis of problems to undertake actions that facilitate their resolution and take advantage of the opportunities available

Lifelong learning

- 5. Responsibility and Perseverance:** Commitment and constancy in the task being performed, assuming the consequences that derive from it
- 6. Learning and adaptation:** Ability to learn throughout life, update and adaptability to new situations and challenges
- 7. Analysis, synthesis, and critical skills:** Identify, simplify and improve understanding of problems through a critical and creative restructuring of knowledge

Ethical Social Commitment

- 8. Teamwork and cooperation:** Work in coordination, with the participation of all members to achieve common goals; the division of effort is linked in a single common result
- 9. Commitment to the organization:** commitment of the person with the vision, strategy, goals and culture of the organization, institution or company
- 10. People orientation:** Permanent attitude of having the needs and demands of others in mind to give a good service

Personal Identity

- 11. Communication skills:** Transmit and know how to receive information clearly and adapted to the context, whether oral, written, verbal or nonverbal
- 12. Resilience and frustration tolerance:** Remaining stable against impediments or unfavorable situations, overcoming and learning from each of them
- 13. Pursuit of excellence:** Assume the need and principle of doing things in the best way possible that is under the idea of development and continuous growth
- 14. Self-awareness:** Self-efficacy to perform a task, take responsibility or face the vital challenges in different areas

15. Working under pressure: Resistance to stress and self-control of one's emotions in situations of opposition, hostility or provocation

Initiative

16. Innovation: Ability to generate ideas, develop them, evaluate them with a feasible criteria and implement them to achieve solutions or improve them in any professional environment

17. Conflict resolution and negotiation techniques: Find suitable solutions to the conflicts that have arisen, identifying and studying the problems and possible solutions and alternatives

18. Leadership: To have responsibility and to act as support or guide of others with great communication skills and understanding of the viewpoints of each member of a group

19. Entrepreneurship: Ability to take risks, innovate, be creative and geared towards growth

337 Note: Extracted from Martinez-Clares and Gonzalez-Lorente (2019).

338 The survey was pretested with college students enrolled in a forestry major to identify
339 potential issues and to refine survey language and flow. The survey was administered online
340 using Qualtrics to students enrolled in FNR programs across the United States between February
341 and May 2024.

342 We recruited students from institutions enlisted in the National Association of University
343 Forest Resource Programs (NAUFRP) (List of institutions adapted from Sharik et al., 2015). We
344 identified and contacted a total of 64 department heads or chairpersons from 58 institutions via e-
345 mail to request their support distributing the survey package within their student body (including
346 students in associate's, bachelor's, master's, and doctoral programs). While recruiters from 59
347 forest related associations across the U.S were invited to participate in the study. The range of
348 associations represented the entire supply chain of the forest sector industry, including
349 associations of forest landowners, loggers, transportation, foresters, arborists, urban forestry
350 specialists, wood products manufacturers, pulp and paper manufacturers, carbon markets, state
351 associations, and federal agencies. Efforts were made to ensure representation from diverse
352 groups, including minority (e.g., Tribal and Hispanic) and women's forest organizations.

353 The survey package consisted of a brief project description, survey link, FAQs page, and
354 invitation flyer. Following a modified version of the Dillman's method, two follow-up reminder
355 emails were sent to ensure the opportunity for survey dissemination.

356 This study employed a purposive sampling approach (non-probability sampling) to get a
357 baseline understanding of the future FNR workforce. While providing valuable information,
358 there are limitations to this approach, such as the sample may not represent the broad FNR
359 student and recruiter population; therefore, generalizing the findings should be approached with
360 caution (Champ et al. 2017).

361 4. Results

362 4.1. Characteristics of the sample

363 Of the 64 department heads and chairpersons invited to participate in this study, only 8
364 agreed to distribute the survey with their student body, resulting in 189 student responses.
365 However, only 86 responses with fully completed questions were considered usable for the
366 analysis (Table 2). These students were distributed across various regions¹: Southern region
367 (35%), Western region (31%), North Central region (29%), Northeast region (1%). About 4% of
368 the students did not specify the state where they studied. We acknowledge that the responses
369 may not be perfectly distributed across the U.S., potentially introducing sampling bias, which
370 reduces external validity and limits the generalizability (Khorsan & Crawford, 2014). The
371 geographic distribution of responses is skewed because we completely relied on department
372 leadership's willingness to distribute our survey to students and regional forestry program

¹ Responses group based on the four regions identified by the National Association of Universities Forest Resources Programs (NAUFRP).

373 availability. Institutions in the Southern and Western regions, where forestry and natural resource
374 programs are more concentrated, were more likely to be represented, while the Northeast where
375 there are fewer forestry and natural resource programs, was significantly underrepresented.

376 Additionally, we do not provide response rate information because it is unclear how many
377 students received the link to our survey. However, we describe the demographic characteristics
378 of the general population of college students in the U.S. for reference.

379

Accepted version

380 Table 2. Educational and demographic profile of forest and natural resources students answering the
 381 survey.

Student Profile	Description	Freq.	Percent
<i>Degree level</i>	<i>Categorical</i>		
Bachelor*	1, if pursuing a bachelor's degree student; else 0	51	59.30%
Master	1, if pursuing a master's degree student; else 0	25	29.07%
Doctoral	1, if pursuing a doctoral degree student; else 0	10	11.63%
<i>Field of study</i>	<i>Dummy</i>		
Forestry	1, if enrolled in a forestry or wood science/products major, else 0	59	68.60%
Other field	1, if enrolled in other natural resources major, else 0	27	31.40%
<i>Extracurricular Activities</i>	<i>Dummy</i>		
Internship	1, if participated in internship, else 0	59	68.60%
Club	1, if member of a student organization or club, else 0	66	76.74%
<i>Age</i>	<i>Dummy</i>		
Age24	1, if student's age is 24 years or younger, else 0	46	53.49%
Age25+	1, if student's age is 25 years or older, else 0	40	46.51%
<i>Race/Ethnic Background</i>	<i>Categorical</i>		
White*	1, if identify as White or Caucasian, else 0	66	76.74%
Black	1, if identify as Black or African American, else 0	3	3.49%
Asian	1, if identify as Asian, else 0	10	11.63%
Multiracial	1, if identify as Two or more races, else 0	7	8.14%
Latino	1, if identify as Hispanic, Latino or Spanish origin, else 0	5	5.81%
<i>Gender Identity</i>	<i>Categorical</i>		
Man*	1, if identify as man, else 0	41	47.67%
Woman	1, if identify as woman, else 0	39	45.35%
Other gender	1, if identify as other gender, else 0	6	6.98%
<i>Sexual Orientation</i>	<i>Categorical</i>		
Straight*	1, if identify as straight, else 0	58	67.44%
Gay	1, if identify as gay or lesbian, else 0	5	5.81%
Other sex	1, if identify as other sexual orientation, else 0	23	26.74%

382 *Reference category omitted from the ordinal regression model and used as baseline for comparison with
 383 other categories within the respective variable.

384

385 In terms of educational background, 59% of students were pursuing a bachelor's, 29% a

386 masters, and 12% a doctoral degree. About 69% of students were enrolled in a forestry or wood

387 science/products major, compared to 31% enrolled in other natural resources majors. The
388 majority were involved in extracurricular activities, with 69% participating in internship
389 programs and 77% being members of student associations or clubs.

390 According to the National Center for Education Statistics (2023), 85% of undergraduate
391 and 35% of graduate students are under the age of 25. In our sample, 93% of undergraduate
392 students are under 25, which is higher than the national average, and only 7% of graduate
393 students are under this age, which is lower than the national average. White students make up
394 between 52% and 60% of the U.S. undergraduate and graduate population, respectively
395 (National Center for Education Statistics, 2023), while 76% of students in natural resources
396 programs² identify as White (USDA Food and Agricultural Education Information System,
397 2022). Our sample shows a similar trend, with 77% of respondents identifying as White. The
398 gender distribution in our sample shows that 48% are men and 45% are women. The enrollment
399 data for all academic areas within natural resource programs in the U.S. shows that men account
400 for 46% and women account for 54% of all enrollments. However, specific to the forestry
401 academic area, men account for 65% of total enrollment in 2023 (USDA Food and Agricultural
402 Education Information System, 2022). Additionally, 7% of our samples identify with another
403 gender identity. In terms of sexual orientation, the majority of the students in our sample identify
404 as straight, while 6% as gay, and 27% as other sexual orientation. Data on other gender identity
405 and sexual orientation for the broader U.S. student population are not available for direct
406 comparison.

² Natural Resources degree programs include Forestry, Wood Science/Products, Fisheries and Wildlife, Natural Resources Recreation, Watershed Science and Management, Range Science and Management, Natural Resources Conservation and Management, and Environmental Science (USDA Food and Agricultural Education Information System 2022).

407 4.2. Development of Professional Competencies

408 On average, students strongly or somewhat agreed that their educational training helped
409 them develop the surveyed skills. Sixteen out of the 19 professional competencies received mean
410 scores of 4 or higher on the 5-point Likert scale (Table 3). The top five competencies were:
411 analysis, synthesis, and critical skills (4.73), responsibility and perseverance (4.64), learning and
412 adaptation (4.62), planning and organization (4.59), and communication (4.51). In contrast, the
413 lowest mean scores were reported for entrepreneurship (3.12), conflict resolution and negotiation
414 techniques (3.80), and innovation (3.98).

415

416

Accepted version

417
418

Table 3. Comparison of students' perceived development of professional competencies through educational training and recruiters' agreement on the importance of these competencies for employment.

Professional Competency	Mean Importance Recruiter (Obs.=74)	Cronbach's alpha (α)	Mean Development Student (Obs.=108)	Cronbach's alpha (α)	p-value
1. Adapting to change	4.61	0.81	4.64	0.76	0.783
1.1 Planning and organization skills	4.55		4.59		0.565
1.2 Flexibility and orientation to change	4.46		4.42		0.697
1.3 Motivation for achievement	4.46		4.37		0.697
1.4 Decision-making	4.43		4.45		0.957
2. Lifelong learning	4.68	0.76	4.72	0.83	0.515
2.1 Responsibility and perseverance	4.81 ^a		4.64 ^b		0.020
2.2 Learning and adaptation	4.59		4.62		0.752
2.3 Analysis, synthesis, and critical skills	4.54 ^a		4.73 ^b		0.022
3. Ethical Social Commitment	4.35	0.77	4.26	0.62	0.291
3.1 Teamwork and cooperation	4.62		4.36		0.062
3.2 Commitment to the organization	4.30		4.03		0.062
3.3 People orientation	4.14		4.21		0.502
4. Personal Identity	4.49	0.78	4.31	0.78	0.092
4.1 Communication skills	4.59		4.51		0.312
4.2 Resilience and tolerance to frustration	4.52 ^a		4.16 ^b		0.006
4.3 Pursuit of excellence	4.50		4.37		0.178
4.4 Self-awareness	4.48 ^a		4.14 ^b		0.006
4.5 Working under pressure	4.18		4.27		0.201
5. Initiative	4.14^a	0.80	3.87^b	0.74	0.044
5.1 Innovation	4.09		3.98		0.570
5.2 Conflict resolution and negotiation techniques	4.03		3.80		0.202
5.3 Leadership	4.00 ^a		4.10 ^b		0.337
5.4 Entrepreneurship	3.80		3.12		<0.001

419 Note: The mean score of professional competencies was calculated using responses to a 5-point Likert
420 scale (1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree,
421 5=strongly agree). Different superscripts (a, b) denote significant difference (p -value <0.05) between
422 recruiters and students mean scores using the Wilcoxon rank-sum test.

423

424 When asked about whether it's important the potential employees have any of the 19
425 professional competencies measured, recruiters, on average, strongly or somewhat agreed with
426 18 of them, all receiving mean scores of 4 or higher. The top five competencies identified by
427 recruiters were: responsibility and perseverance (4.81), teamwork and cooperation (4.62),
428 learning and adaptation (4.59), communication skills (4.59), and planning and organization skills
429 (4.55). Entrepreneurship received the lowest mean score (3.80). Overall, students and recruiters
430 were consistent in their assessments, with both groups yielding scores of four points or higher for
431 most of the competencies. In addition, both groups produced the highest mean scored for four of
432 the same competencies in their top five (responsibility and perseverance, learning and adaptation,
433 planning and organization, and communication) while placing entrepreneurship last. Based on
434 the global averages for each of the five units of competency, students and recruiters alike yielded
435 the highest mean score in the development of lifelong learning skills and the lowest in initiative
436 skills.

437 4.3. Preparedness to enter the labor market

438 For *perceived preparedness*, our dependent variable in the ordered logistic regression
439 (Table 4), 35% of students strongly agreed, 55% somewhat agreed, 5% neither agreed nor
440 disagreed, and 6% somewhat disagreed with the statement that they were prepared to enter the
441 labor market. No respondents strongly disagreed.

442

443

444 Table 4. Ordered logistic regression results of forest and natural resources students' perceived
 445 preparedness to enter the labor market.

	Coefficient	Std. err.
Adapting to change	1.361	0.735
Lifelong learning	-1.515**	0.687
Ethical Social Commitment	-0.314	0.467
Personal Identity	0.085	0.629
Initiative	0.281	0.47
Master's degree	1.185	0.903
Doctoral degree	0.544	1.152
Forestry major	0.305	0.605
Internship participation	0.458	0.552
Club participation	0.388	0.677
Age 25 years or older	0.041	0.757
Black	-3.538**	1.658
Asian	-1.49	0.899
Two+ races	1.383	1.054
Latino	-1.696	1.246
Woman	-1.555**	0.649
Other gender identity	-4.931***	1.292
Gay or lesbian	3.634**	1.601
Other sexual orientation	-0.323	0.672
Observations	86	

446 Statistical significance indicated by ** $p < 0.05$, *** $p < 0.01$

447

448 The ordinal regression analysis suggests that educational background factors, such as
 449 degree level, such as master's or doctoral degree, forestry major, or participation in
 450 extracurricular activities, such as internships and student clubs, were not significant predictors of
 451 students' perceived preparedness to enter the labor market (Table 4). Of the five units of
 452 professional competency included in the model lifelong learning had a negative impact on
 453 perceived preparedness. Other competencies, including adapting to change, ethical social
 454 commitment, personal identity, and initiative were not statistically significant predictors.

455 Regarding demographic characteristics, both Women and Other gender identity
 456 respondents were significantly less likely to report feeling prepared to enter the labor market

457 compared to men (the reference category). Similarly, Black and African American respondents
458 were less likely to feel prepared compared to White individuals (the reference category). In
459 contrast, Gay or lesbian respondents, compared to straight respondents (the reference category),
460 were more likely to agree that they were prepared to enter the labor market. Age did not have a
461 significant impact on preparedness.

462 **5. Discussions and Conclusions**

463 5.1. Gen X recruiters and Gen Z students

464 Although our student respondents' age is consistent with the U.S. national average
465 (National Center for Education Statistics, 2023), our recruiters show a contrast trend with
466 national statistics. The recruiters' respondents median age is 58 years old (Larasatie, 2025),
467 exceeding the median age of the U.S. labor force, which was 41.6 years in 2023 and projected to
468 be 42.4 years in 2033 (U.S. Bureau of Labor Statistics, 2024). This fact corroborates the trend of
469 an aging workforce in this industry, highlighting potential challenges due to future retirement
470 patterns and the industry's capacity to attract and retain younger, diverse talent (Korhonen et al.,
471 2024; Larasatie et al., 2019).

472 There are similarities between students' self-assessed development and recruiters'
473 importance ratings across most competencies. Three competencies: "adapting to change",
474 "planning and organization skills", and "communication skills"; show close agreement. This
475 alignment may suggest that FNR students have a good understanding of the competencies valued
476 by employer expectations, supporting a premise that better alignment contributes to a more
477 satisfied and effective workforce. Furthermore, this consistency highlights the effectiveness of
478 FNR educational programs in conveying industry-relevant skills.

479 However, when comparing the mean scores of both students' development and recruiters'
480 need for professional competencies, we also observed multiple significant differences between
481 them. For instance, recruiters placed significantly greater importance on competencies such as
482 "responsibility and perseverance" and "resilience and tolerance to frustration" compared to
483 students' self-reported development of these skills. This suggests that employers' expectations
484 for these skills might exceed students' current preparation. On the other hand, students' report a
485 significantly higher level of development of analysis, synthesis, and critical skills than recruiters
486 expect, which may indicate that students (and perhaps universities) prioritize these skill sets in
487 their studies and curricula.

488 The perception differences between our students and recruiters' respondents may stem
489 not only from generational differences, but also from differing levels of perceived belonging and
490 psychological connectedness to the professional FNR environment. The concept of 'generation'
491 here is used as an expansive context to denote a form of social identity shaped by individuals'
492 collective experiences, understandings, and the particular social and political events encountered
493 over their lifetimes (Mannheim, 1991). Similarly, the concept of belonging refers to an
494 individual's attachment to certain social groups, social solidarities, or social collectivities
495 (Yuval-Davis, 2006). These groups form through shared values, attitudes, cultures, emotional
496 connections or through involvement in particular social practices, ideas, and cultures (Halse,
497 2018).

498 While family-based generations undergo transitions (such as from grandparents to parents
499 to children), generational cohort groups can offer enduring, but perhaps less stable, forms of
500 identity. Occasionally, such markers symbolize certain sets of values and perspectives,
501 exemplified by the prevalent concepts of "baby boomers", "Gen X", "millennials", or "Gen Z".

502 Following generation definitions by Pew Research Center (2015), our recruiter respondents
503 belong to Gen X, defined as those born between 1965-1980. Experiencing salient events such as
504 the AIDS epidemic and the 1973 oil crisis, Gen X is “emotionally repressed” (Lee, 1996, p. 53).
505 They are pragmatic and practical, with outstanding coping abilities. They may appear superficial
506 as they often conceal profound feelings and confide in just a handful of people (Lee, 1996). This
507 generation has acquired the understanding that nothing should be taken for granted, given the
508 unpredictability of the future (Dries et al., 2008). They do not rely on organizations for care,
509 security, and stability in their careers.

510 While according to Dimmock (2019), our student respondents belong to Gen Z, born in the period
511 1997-2012. This generation is the inaugural cohort born within an increasingly digital society.
512 Profoundly influenced by unique disruptions such as rapid technological advancements, a national
513 pandemic, political turmoil, and racial inequality, have shaped Gen Z’s worldview and approach
514 to work (Pichler et al., 2021). These disruptions have also set Gen Z apart from previous
515 generations. Integrated with advanced technology in their lives and activities, Gen Z students are
516 career-oriented and skill-focused (Schwieger & Ladwig, 2018). Also often described as success-
517 oriented (Leslie et al., 2021), Gen Z students are highly interested in the abilities, skills, and
518 competencies that can be acquired during their education, where they feel a stronger sense of
519 belonging (Toma & Hudea, 2024). Conversely, they may undervalue competencies like
520 “responsibility and perseverance” or “resilience,” which are more characteristic of long-term
521 industry experience and emphasized by a cohort they may not yet identify with. A lack of
522 belonging can lead students to feel disconnected from the values and expectations of the
523 professional community, even when educational programs are well-aligned with industry
524 standards (Walton & Cohen, 2007). These disruptions have also set Gen Z apart from previous

525 generations. Since, the FNR professional are predominantly composed of older, less diverse
526 professionals, students entering a workforce perceive a lack of social connection or shared, thus
527 they may experience diminished belonging (Walton & Cohen, 2007).

528 Several studies suggest that broader structural and policy changes, rather than
529 generational attitudes, have a significant impact on workforce trends. Technological
530 advancements, policy shifts, and economic constraints significantly shape employment patterns
531 (Bullard et al., 2014). Structural barriers like declining federal forestry budgets, change in land
532 management policies (He et al., 2021), and the evolving role of private sector stakeholders have
533 a more significant impact on workforce trends than generational attitudes (Sharik et al., 2015).
534 For example, Balcarczyk et al. (2015) found that the decline enrollment in forestry program and
535 reduced interest in government forestry jobs was not solely due to changing generational
536 preferences but rather complex hiring processes, mobility requirements, lower salaries, and a
537 general lack of knowledge about forestry careers.

538 Another key criticism of generational theories is their failure to consider intersectional
539 factors such as race, gender, and cultural background. Research in FNR indicates that workforce
540 diversity gap is on the rise (Korhonen et al., 2024), and generational models fail to sufficiently
541 account for the experiences of historically underrepresented groups.

542 5.2. Lifelong learning and sense of belonging

543 Both “responsibility and perseverance” and “analysis, synthesis, and critical skills” items
544 fall within the lifelong learning professional competency (Martinez-Clares & Gonzalez-Lorente,
545 2019). The idea of lifelong learning comes from policy and practice, not from theoretical issues
546 (Field, 1997). Regarding the workforce, lifelong learning may be understood as having two
547 interrelated yet separate meanings (Field, 2013). Organizations occasionally utilize the term to

548 denote continuing professional development, primarily concerning structured learning for senior
549 managers and members of professional associations, wherein the employee bears substantial
550 responsibilities, formally stated or not, for remaining informed about recent advancements.
551 Secondly, it suggests, both implicitly and explicitly, that lifelong learning is an initiative
552 undertaken by workers themselves, rather than being confined to opportunities offered by
553 employers; it encompasses various learning modalities, including but not restricted to
554 participation in formal courses (Field, 2013).

555 Despite lifelong learning being considered essential for cultivating a versatile, adaptive,
556 and employable workforce (Field, 2013), our analysis reveals a significant negative correlation
557 between students' lifelong learning and their perceived preparedness for the workforce. This
558 trend may mean that the more students know or learn, the more they realize there is so much
559 more to know or learn. Therefore, although they score high, they still don't feel prepared. The
560 significant negative correlation is also found on student respondents who identified themselves
561 as Black, women, or other gender identities. In a white male-dominated sector like FNR, women
562 and minorities are more likely to experience imposter syndrome (e.g., Larasatie et al., 2024a).
563 The term is introduced in a psychological study of high-achieving women (Clance & Imes,
564 1978). Despite their outstanding accomplishments, the respondents in this study persistently
565 doubt their skills, fearing exposure as fraud.

566 The negative correlation results also suggest that our student respondents may have
567 shifted their focus to answering the questions of "would I be ready" to "would I belong in" the
568 FNR workforce. Fostering a sense of belonging requires deliberate effort (Bullard et al., 2024).
569 Belonging, or a sense of connectedness and the perception of significance to people around us,
570 correlates with enhanced academic performance, persistence, and engagement (Lu, 2022).

571 Our findings show that FNR students from some genders and racial minorities feel less
572 belonging than their counterparts align with similar research. In a nationally representative
573 sample, the sense of belonging among first-year U.S. college students differs according to
574 significant institutional and student variables (Gopalan and Brady, 2020). Notably, racial-ethnic
575 minority and first-generation students report a diminished sense of belonging compared to their
576 peers at four-year institutions.

577 Young, women, and racial/ethnic minorities exhibit great reluctance to entering FNR
578 workforce (Gharis et al., 2017; Rekola and Sharik, 2022). Sharik et al. (2015) identified racial
579 discrimination as a critical factor contributing to the persistently low enrollment of racial
580 minorities in natural resource disciplines. Historical discriminatory practices were entrenched in
581 societal institutions that resulted in the exclusion of racial and ethnic minorities from land and
582 resources. Presently, women and minorities articulate apprehensions regarding a pervasive
583 deficiency of diversity in FNR professions and the possibility of job discrimination (Sharik et al.,
584 2015).

585 It is important to note that the FNR sector has undertaken several initiatives throughout
586 the years to enhance the sense of belonging. A diverse array of networks has been intentionally
587 built, not just inside universities but also in professional groups. At the university level, for
588 example, SWIFT (Supporting Women in Forestry Today) has been formed to retain forestry
589 students at the University of Maine (Crandall et al. 2020). Certain FNR colleges have also begun
590 to provide staff positions specifically aimed at aiding first-generation, women, and historically
591 underrepresented minority students (Bullard et al., 2024). In professional group settings, the
592 Society of American Foresters (SAF), currently the largest FNR professional organization in the

593 U.S., has established a Diversity and Inclusion Working Group and presents annual diversity
594 awards (Society of American Foresters, 2024).

595 Despite those efforts, there remains a significant amount of work to be done, particularly
596 when considering our findings that students who identify as Black, women, or other gender
597 identities feel less prepared to enter the FNR workforce. Suh and Owens (2021) assert that
598 students of color can gain from the narratives of diverse peers regarding transient belonging
599 uncertainty, as numerous students grapple with internalized racial stereotypes concerning
600 academic success and the historical underrepresentation of students of color in higher education.
601 Hurtado and Carter (1997) discovered that for Hispanic college students, interactions with peers
602 outside of class and participation in religious and social-community organizations were
603 significantly correlated with their sense of belonging. Leaders of the FNR program could
604 facilitate chances for students to articulate their experiences of belonging, both in academic and
605 extracurricular settings. This can be done through mentorship or networking based on shared
606 social identities or life stages.

607 **Acknowledgement**

608 This project is funded by the U.S. Forest and Wood Products Sector Inclusion Council
609 through the U.S. Endowment for Forest and Communities.

610

611 **References**

- 612 Allen, K.-A., Kern, M. L., Rozek, C. S., McInerney, D. M., & Slavich, G. M. (2021). Belonging:
613 A review of conceptual issues, an integrative framework, and directions for future
614 research. *Australian Journal of Psychology*, 73(1), 87–102.
615 <https://doi.org/10.1080/00049530.2021.1883409>.
- 616 Arkansas Center for Forest Business. (2023). US Forestry Economic Contributions by State
617 2023. Available online: <https://www.uamont.edu/academics/CFANR/acfb.html> (accessed
618 on 16 November 2024).
- 619 Arum, R., & Hout, M. (1998). The early returns: The transition from school to work in the
620 United States. In Y. Shavit & W. Müller (Eds.), *From school to work: A comparative*
621 *study of educational qualifications and occupational destinations* (pp. 471–510). Oxford:
622 Clarendon Press.
- 623 Bakhru, K. M. (2017). Personal competencies for Effective teaching: A Review Based Study.
624 *Educational Quest- An International Journal of Education and Applied Social Sciences*,
625 8(spl), 297. <https://doi.org/10.5958/2230-7311.2017.00067.8>
- 626 Bal, T. L., Rouleau, M. D., Sharik, T. L., & Wellstead, A. M. (2020). Enrollment decision-
627 making by students in forestry and related natural resource degree programmes globally.
628 *International Forestry Review*, 22(3), 287-305.
- 629 Balcarczyk, K. L., Smaldone, D., Selin, S. W., Pierskalla, C. D., & Maumbe, K. (2015). Barriers
630 and Supports to Entering a Natural Resource Career: Perspectives of Culturally Diverse
631 Recent Hires. *Journal of Forestry*, 113(2), 231–239. <https://doi.org/10.5849/jof.13-105>

- 632 Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal
633 attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497–
634 529. <https://doi.org/10.1037/0033-2909.117.3.497>.
- 635 Bullard, S. H., Walker, T. J., & Burger, L. (2024). Enhancing Diversity in Undergraduate Degree
636 Programs in Forestry and Related Natural Resources: A Brief Review of Critical Issues
637 and Promising Actions. *Journal of Forestry*, 122(2), 107-122.
638 <https://doi.org/10.1093/jofore/fvad043>
- 639 Bullard, S. H., Stephens Williams, P., Coble, T., Coble, D. W., Darville, R., & Rogers, L. (2014).
640 Producing “Society-Ready” Foresters: A Research-Based Process to Revise the Bachelor
641 of Science in Forestry Curriculum at Stephen F. Austin State University. *Journal of*
642 *Forestry*, 112(4), 354–360. <https://doi.org/10.5849/jof.13-098>
- 643 Champ, P. A., Boyle, K. J., & Brown, T. C. (2017). *A Primer on Nonmarket Valuation* (2 ed.).
644 (outside the USA): Springer Dordrecht. <https://doi.org/10.1007/978-94-007-7104-8>
- 645 Chuang, A., Shen, C.-T., & Judge, T. A. (2016). Development of a Multidimensional Instrument
646 of Person-Environment Fit: The Perceived Person-Environment Fit Scale (PPEFS):
647 Multidimensional Instrument of Person-Environment Fit. *Applied Psychology*, 65(1), 66–
648 98. <https://doi.org/10.1111/apps.12036>
- 649 Civelli, F. (1998). Personal competencies, organizational competencies, and employability.
650 *Industrial and Commercial Training*, 30(2), 48–52.
651 <https://doi.org/10.1108/00197859810207652>
- 652 Clance, P. R., & Imes, S. A. (1978). The imposter phenomenon in high achieving women:
653 Dynamics and therapeutic intervention. *Psychotherapy: Theory, Research & Practice*,
654 15(3), 241–247. <https://doi.org/10.1037/h0086006>

655 Dimock, M. (2019). Defining generations: Where Millennials end, and Generation Z begins.
656 Available online: [https://www.pewresearch.org/short-reads/2019/01/17/where-](https://www.pewresearch.org/short-reads/2019/01/17/where-millennials-end-and-generation-z-begins/)
657 [millennials-end-and-generation-z-begins/](https://www.pewresearch.org/short-reads/2019/01/17/where-millennials-end-and-generation-z-begins/) (accessed on 16 November 2024).

658 Dries, N., Pepermans, R., & De Kerpel, E. (2008). Exploring four generations' beliefs about
659 career: Is “satisfied” the new “successful”? *Journal of Managerial Psychology*, 23(8),
660 907-928. <https://doi.org/10.1108/02683940810904394>

661 EEOC (Equal Employment Opportunity Commission). (2022). EEO-1 Employer Information
662 Report Statistics. Available online: [https://www.eeoc.gov/data/eo-1-employer-](https://www.eeoc.gov/data/eo-1-employer-information-report-statistics)
663 [information-report-statistics](https://www.eeoc.gov/data/eo-1-employer-information-report-statistics) (accessed on 18 March 2025).

664 European Forest Institute. (2021). Trends in forest-related employment and tertiary education:
665 Insights from selected key countries around the globe. Available online:
666 [https://efi.int/publications-bank/trends-forest-related-employment-and-tertiary-education-](https://efi.int/publications-bank/trends-forest-related-employment-and-tertiary-education-insights-selected-key)
667 [insights-selected-key](https://efi.int/publications-bank/trends-forest-related-employment-and-tertiary-education-insights-selected-key) (accessed on 21st February 2025).

668 Fenzel. (2013). Examining Generational Differences in the Workplace: Work Centrality,
669 Narcissism, and Their Relation to Employee Work Engagement [Thesis and
670 Dissertations]. <https://dc.uwm.edu/etd/350>.

671 Field, J. (2013). Learning Through the Ages? Generational Inequalities and Inter-Generational
672 Dynamics of Lifelong Learning. *British Journal of Educational Studies*, 61:1, 109-119.
673 <http://dx.doi.org/10.1080/00071005.2012.756172>

674 Field, J. (1997). The Learning Society and the European Union: a critical assessment of
675 supranational education policy formation. *Journal of Studies in International Education*,
676 1, 2, 73-82. <https://doi.org/10.1177/102831539700100205>

677 Forest Resources Association. (2023). Why FRA supports the Job in the Woods Act. Available
678 online: [https://forestresources.org/wp-content/uploads/2023/10/Jobs-In-the-Woods-](https://forestresources.org/wp-content/uploads/2023/10/Jobs-In-the-Woods-Act_102023.pdf)
679 [Act_102023.pdf](https://forestresources.org/wp-content/uploads/2023/10/Jobs-In-the-Woods-Act_102023.pdf) (accessed on 16 November 2024).

680 Gharis, L.W., Laird, S.G., Osborne, D.C., 2017. How do university students perceive forestry
681 and wildlife management degrees? *J. For.* 115 (6), 540–547. [https://doi.](https://doi.org/10.5849/JOF-2016-080R3)
682 [org/10.5849/JOF-2016-080R3](https://doi.org/10.5849/JOF-2016-080R3).

683 Gibbs, S., Steel, G., & Kuiper, A. (2011). Expectations of competency: The mismatch between
684 employers' and graduates' views of end-user computing skills requirements in the
685 workplace. *Journal of Information Technology Education: Research*, 10(1), 371-382.

686 Gopalan, M., & Brady, S. T. (2020). College students' sense of belonging: A national
687 perspective. *Educational Researcher*, 49(2), 134-137.

688 Halse, C. (2018). Theories and Theorising of Belonging. In C. Halse (Ed.), *Interrogating*
689 *Belonging for Young People in Schools* (pp. 1–28). Springer International Publishing.
690 https://doi.org/10.1007/978-3-319-75217-4_1.

691 Larasatie, P. (2025). *Forest and wood products sector workforce survey insights*. Available
692 online: [https://vtechworks.lib.vt.edu/server/api/core/bitstreams/094bdf0-3c23-4c49-](https://vtechworks.lib.vt.edu/server/api/core/bitstreams/094bdf0-3c23-4c49-a635-eb1f8cbddaaa/content)
693 [a635-eb1f8cbddaaa/content](https://vtechworks.lib.vt.edu/server/api/core/bitstreams/094bdf0-3c23-4c49-a635-eb1f8cbddaaa/content) (accessed on 30 April 2025).

694 Malau-Aduli, B. S., Jones, K., Alele, F., Adu, M. D., Drovandi, A., Knott, G., ... & Jo, C. (2022).
695 Readiness to enter the workforce: perceptions of health professions students at a regional
696 Australian university. *BMC Medical Education*, 22(1), 89.
697 <https://doi.org/10.1186/s12909-022-03120-4>

698 He, M., Smidt, M., Li, W., & Zhang, Y. (2021). Logging Industry in the United States:
699 Employment and Profitability. *Forests*, 12(12), 1720. <https://doi.org/10.3390/f12121720>

700 Hendrix, R., & Morrison, C. C. (2018). Student Perceptions of Workforce Readiness in
701 Agriculture. *Journal of Agricultural Education*, 59(3), 213-228.
702 <https://doi.org/10.5032/jae.2018.03213>

703 Herringer, J. M. (2002). Once isn't enough when measuring staff competence. *Nursing*
704 *Management (Springhouse)*, 33(2), 22. [https://doi.org/10.1097/00006247-200202000-](https://doi.org/10.1097/00006247-200202000-00010)
705 00010

706 Hoendervanger, J. G., Van Yperen, N. W., Mobach, M. P., & Albers, C. J. (2022). Perceived Fit
707 and User Behavior in Activity-Based Work Environments. *Environment and Behavior*,
708 54(1), 143–169. <https://doi.org/10.1177/0013916521995480>

709 Hurtado, S., and D.F. Carter. (1997). Effects of College Transition and Perceptions of the
710 Campus Racial Climate on Latino College Students' Sense of Belonging. *Sociology of*
711 *Education* 70 (4): 324–345.

712 Jackson, D. (2016). Modelling graduate skill transfer from university to the workplace. *Journal*
713 *of Education and Work*, 29(2), 199–231. <https://doi.org/10.1080/13639080.2014.907486>

714 Johansson, K., Andersson, E., & Sehlstedt, T. (2019). Workplace harassment in forestry
715 organizations—Gendering the experiences of women and men. *BioProducts Business*,
716 4(10), 125-136.

717 Kerckhoff, A. C. (2003). From student to worker. In *Handbook of the life course* (pp. 251-267).
718 Boston, MA: Springer US.

719 Khorsan, R., & Crawford, C. (2014). External Validity and Model Validity: A Conceptual
720 Approach for Systematic Review Methodology. *Evidence-Based Complementary and*
721 *Alternative Medicine*, 2014(1), 694804. <https://doi.org/10.1155/2014/694804>

722 Kingsley, E. (2024). *The Forest Industry Needs More Young Talent*. Available online:
723 <https://forestresources.org/2024/04/04/the-forest-industry-needs-more-young-talent/>
724 (accessed on 6 May 2025).

725 Kristof-Brown, A., & Guay, R. P. (2011). Person–environment fit. In S. Zedeck (Ed.), *APA*
726 *handbook of industrial and organizational psychology Vol 3: Maintaining, expanding,*
727 *and contracting the organization*. (pp. 3–50). American Psychological Association.
728 <https://doi.org/10.1037/12171-001>

729 Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of
730 individuals’ fit at work: a meta-analysis of person–job, person–organization, person–
731 group, and person–supervisor fit. *Personnel Psychology*, *58*(2), 281–342.
732 <https://doi.org/10.1111/j.1744-6570.2005.00672.x>

733 Korhonen, J., Panwar, R., Henderson, J., Fernholz, K., Leggett, Z., Meyer, E., & Bhuta, A. A. R.
734 (2024). Gaps in diversity representation and data insufficiencies in the U.S. forest sector
735 workforce analysis. *Trees, Forests and People*, *15*, 100486.
736 <https://doi.org/10.1016/j.tfp.2023.100486>

737 Kovacs, M. K. (2021). *Forest sector workforce study report*. Available online:
738 [https://www.valleyvision.org/wp-content/uploads/Forest-Sector-Workforce-Study-Final-](https://www.valleyvision.org/wp-content/uploads/Forest-Sector-Workforce-Study-Final-Report-1.pdf)
739 [Report-1.pdf](https://www.valleyvision.org/wp-content/uploads/Forest-Sector-Workforce-Study-Final-Report-1.pdf) (accessed on 6 May 2025)

740 Larasatie. (2025). *Workforce Study Insights Report*. Available online:
741 [https://usinclusioncouncil.org/wp-content/uploads/2025/01/Workforce-Study-Insights-](https://usinclusioncouncil.org/wp-content/uploads/2025/01/Workforce-Study-Insights-Report.pdf)
742 [Report.pdf](https://usinclusioncouncil.org/wp-content/uploads/2025/01/Workforce-Study-Insights-Report.pdf) (accessed on 6 May 2025).

743 Larasatie, P., Ulifah, C.N. (2023). Mother Leads with Her Heart: A Case Study of Women
744 Worker Leaders in the Men-Dominated Forestry Sector. *Merits*, 3, 432-444.
745 <https://doi.org/10.3390/merits3030025>

746 Larasatie, P., Karisch-Gierer, D., & Ludvig, A. (2022). Women's woodland owner network: a
747 comparative case study of Oregon (the United States) and Austria. *Land*, 11(10), 1653.
748 <https://doi.org/10.3390/land11101653>

749 Larasatie, P., Barnett, T., Hansen, E. (2020a). Leading with the heart and/or the head?
750 Experiences of women student leaders in top world forestry universities. *Scand. J. For.*
751 *Res.* 35 (8), 588–599. <https://doi.org/10.1080/02827581.2020.1825787>

752 Larasatie, P., Barnett, T., & Hansen, E. (2020b). The “Catch-22” of Representation of Women in
753 the Forest Sector: The Perspective of Student Leaders in Top Global Forestry
754 Universities. *Forests*, 11(4), 419. <https://doi.org/10.3390/f11040419>

755 Larasatie, P., Barnett, T., Hansen, E. (2024a). Mentoring and Networking as the “Silver Lining”
756 of Being Women Leaders: An Exploratory Study in Top World Forestry Schools. *Trends*
757 *High. Educ.* 2024, 3, 169–179. <https://doi.org/10.3390/higheredu3010010>

758 Larasatie, P., Jones, E., Hansen, E., & Lewark, S. (2024). A wake-up call? A review of
759 inequality based on the forest-related higher education literature. *Environmental Science*
760 *& Policy*, 162, 103942. <https://doi.org/10.1016/j.envsci.2024.103942>

761 Larasatie, P., Baublyte, G., Conroy, K., Hansen, E., & Toppinen, A. (2019). “From nude
762 calendars to tractor calendars”: The perspectives of female executives on gender aspects
763 in the North American and Nordic forest industries. *Canadian Journal of Forest*
764 *Research*, 49(8), 915–924. <https://doi.org/10.1139/cjfr-2018-0402>

765 Lawrence, A., Spinelli, R., Toppinen, A., & Salo, E. (2017). What are the implications of the
766 bioeconomy for forest-related jobs. *What Science Can Tell Us: Towards a sustainable*
767 *European forest-based bioeconomy—assessment and the way forward*, 8, 108-117.

768 Lee, C. A. (1996). Characteristics of Generation X and Implications for Reference Services and
769 the Job Search. *The Reference Librarian*, 26(55), 51–59.
770 https://doi.org/10.1300/J120v26n55_06

771 Leslie, B., Anderson, C., Bickham, C., Horman, J., Overly, A., Gentry, C., Callahan, C., & King,
772 J. (2021). Generation Z perceptions of a positive workplace environment. *Employee*
773 *Responsibilities and Rights Journal*, 33(3), 171-187. [https://doi.org/10.1007/s10672-021](https://doi.org/10.1007/s10672-021-09366-2)
774 [09366-2](https://doi.org/10.1007/s10672-021-09366-2)

775 Levenson, A. R. (2010). Millennials and the World of Work: An Economist’s Perspective.
776 *Journal of Business and Psychology*, 25(2), 257–264. [https://doi.org/10.1007/s10869-](https://doi.org/10.1007/s10869-010-9170-9)
777 [010-9170-9](https://doi.org/10.1007/s10869-010-9170-9)

778 Li, X., Dai, J., Zhu, X., Li, J., He, J., Huang, Y., Liu, X., & Shen, Q. (2023). Mechanism of
779 attitude, subjective norms, and perceived behavioral control influence the green
780 development behavior of construction enterprises. *Humanities and Social Sciences*
781 *Communications*, 10(1), 266. <https://doi.org/10.1057/s41599-023-01724-9>

782 Locke, D. H., Sachdeva, S. S., Westphal, L. M., Kenefic, L. S., Dockry, M. J., & Fisher, C. L.
783 (2023). Spatially Explicit Assessment of the USDA Forest Service as a Representative
784 Bureaucracy. *Forest Science*, 69(4), 443–451. <https://doi.org/10.1093/forsci/fxad018>

785 Lu, A. (2022). “Connecting Socially”. In *Reimagining the Student Experience, How Colleges*
786 *Can Help Students Connect, Belong, and Engage*, 31–33. Washington, DC: The
787 Chronicle of Higher Education. Available online: <https://studentlife.media.uconn.edu/wp->

788 <content/uploads/sites/810/2024/02/ReimaginingStudentExperience.pdf> (accessed on 16
789 November 2024).

790 Mahmoud, A. B., Reisel, W. D., Fuxman, L., & Mohr, I. (2021). A motivational standpoint of
791 job insecurity effects on organizational citizenship behaviors: A generational study.
792 *Scandinavian Journal of Psychology*, 62(2), 267–275. <https://doi.org/10.1111/sjop.12689>

793 Mahmoud, A. B., Ball, J., Rubin, D., Fuxman, L., Mohr, I., Hack-Polay, D., Grigoriou, N., &
794 Wakibi, A. (2022). Pandemic pains to Instagram gains! COVID-19 perceptions effects on
795 behaviours towards fashion brands on Instagram in Sub-Saharan Africa: Tech-native vs
796 non-native generations. *Journal of Marketing Communications*, 28(8), 864–888.
797 <https://doi.org/10.1080/13527266.2021.1971282>

798 Mannheim, K. (1991). *Ideology and Utopia* (1st ed.). Routledge. 318 pp.
799 <https://doi.org/10.4324/9781315002828>

800 Mannheim, K., & Keeskemati, P. (1952). "The Problem of Generations." In P. Kecskemeti (Ed.),
801 *Essays on the Sociology of Knowledge*. Available online:
802 <https://marcuse.faculty.history.ucsb.edu/classes/201/articles/27MannheimGenerations.pdf>
803 (accessed on 6 May 2025).

804 Martínez-Clares, P., & González-Lorente, C. (2019). Personal and interpersonal competencies of
805 university students entering the workforce: Validation of a scale. *Relieve*, 25(1), 1-18.
806 <http://doi.org/10.7203/relieve.25.1.13164>

807 National Center for Education Statistics. (2023). Characteristics of Postsecondary
808 Students. *Condition of Education*. U.S. Department of Education, Institute of Education
809 Sciences. Available online: <https://nces.ed.gov/programs/coe/indicator/csb> (accessed on
810 15 November 2024).

811 Pew Research Center. (2015). *The Whys and Hows of Generations Research*. Available online:
812 <https://www.pewresearch.org/politics/2015/09/03/the-whys-and-hows-of-generations->
813 [research/](https://www.pewresearch.org/politics/2015/09/03/the-whys-and-hows-of-generations-research/) (accessed on 16 November 2024).

814 Pichler, S., Kohli, C., & Granitz, N. (2021). DITTO for Gen Z: A framework for leveraging the
815 uniqueness of the new generation. *Business Horizons*, 64(5), 599-610.
816 <https://doi.org/10.1016/j.bushor.2021.02.021>.

817 Project Learning Tree. (2019). *The Future of Forestry is Female—Project Learning Tree*.
818 Available online: <https://www.plt.org/news/the-future-of-forestry-is-female/> (accessed on
819 16 November 2024).

820 Rekola, M., Sharik, T. (2022). Global Assessment of Forest Education: Creation of a Global
821 Forest Education Platform and Launch of a Joint Initiative under the Aegis of the
822 Collaborative Partnership on Forests (FAO-ITTO-IUFRO project GCP/GLO/044/GER).

823 Rekola, M., Nevgi, A., & Sandström, N. (2021). *Regional Assessment of Forest Education in*
824 *Europe*. FAO. Rome, Italy. Available online:
825 <https://openknowledge.fao.org/server/api/core/bitstreams/a85aa99b-beaa-41c0-9474->
826 [eb2e00630506/content](https://openknowledge.fao.org/server/api/core/bitstreams/a85aa99b-beaa-41c0-9474-eb2e00630506/content) (accessed on 21 February 2025)

827 Rodríguez-Piñeros, S., Walji, K., Rekola, M., Owuor, J. A., Lehto, A., Tutu, S. A., & Giessen, L.
828 (2020). Innovations in forest education: Insights from the best practices global
829 competition. *Forest Policy and Economics*, 118, 102260.
830 <https://doi.org/10.1016/j.forpol.2020.102260>

831 Rosenberg, M., & McCullough, B. C. (1981). Mattering: Inferred significance and mental health
832 among adolescents. *Research in Community & Mental Health*, 2, 163–182.

833 Rouleau, M., Sharik, T. L., Whitens, S., & Wellstead, A. (2017). Enrollment decision-making in
834 U.S. forestry and related natural resource degree programs. *Natural Sciences Education*,
835 46(1), 170007. <https://doi.org/10.4195/nse2017.05.0007>

836 Rudolph, C. W., & Zacher, H. (2016). Considering generations from a lifespan developmental
837 perspective. *work, ageing and retirement*. <https://doi.org/10.1093/workar/waw019>

838 Sample, V. A., Bixler, R. P., McDonough, M. H., Bullard, S. H., & Snieckus, M. M. (2015). The
839 promise and performance of forestry education in the United States: Results of a survey
840 of forestry employers, graduates, and educators. *Journal of Forestry*, 113(6), 528–537.
841 <https://doi.org/10.5849/jof.14-122>

842 Schwieger, D. and Ladwig, C. (2018). Reaching and retaining the next generation: Adapting to
843 the expectations of Gen Z in the classroom. *Information Systems Education Journal*,
844 16(3), pp. 45-54.

845 Sharik, T. L., Lilieholm, R. J., Lindquist, W., & Richardson, W. W. (2015). Undergraduate
846 enrollment in natural resource programs in the United States: Trends, drivers, and
847 implications for the future of natural resource professions. *Journal of Forestry*, 113(6),
848 538–551. <https://doi.org/10.5849/jof.14-146>

849 Sharik, T. L., Storer, A. J., Bal, T. L., & Abbas, D. (2020). *Education as a driver of change in*
850 *U.S. forests and the forest sector*. Available online:
851 https://www.fs.usda.gov/nrs/pubs/gtr/gtr-nrs-p-197papers/09-sharik-gtr_nrs-p-197.pdf
852 (accessed on 21 February 2025).

853 Sheppard, J. P., Chamberlain, J., Agúndez, D., Bhattacharya, P., Chirwa, P. W., Gontcharov, A.,
854 Sagona, W. C. J., Shen, H., Tadesse, W., & Mutke, S. (2020). Sustainable forest
855 management beyond the timber-oriented status quo: Transitioning to co-production of

856 timber and non-wood forest products—a global perspective. *Current Forestry Reports*,
857 6(1), 26–40. <https://doi.org/10.1007/s40725-019-00107-1>

858 Strauss, W., & Howe, N. (1991). *Generations: The history of America's future, 1584 to 2069*.
859 New York, William Morrow and Company Inc. 151–156.
860 <https://doi.org/10.1177/153660069301400207>.

861 Strayhorn, T. L. (2018). *College Students' Sense of Belonging* (2nd ed.). Routledge.
862 <https://doi.org/10.4324/9781315297293>.

863 Suh, E.K., and S. Owens. (2021). Reflecting on Belonging: Stories to Normalize College
864 Transition and Encourage Engagement. *Journal of Access, Retention, and Inclusion* 4 (1):
865 1–16.

866 Sustainable Forestry Initiative. (2022). *Celebrating the Contributions of Black Americans in*
867 *Conservation*. Available online: [https://forests.org/celebrating-the-contributions-of-black-](https://forests.org/celebrating-the-contributions-of-black-americans-in-conservation/)
868 [americans-in-conservation/](https://forests.org/celebrating-the-contributions-of-black-americans-in-conservation/) (accessed on 16 November 2024).

869 Tajfel, H. and Turner, J.C. (1986) The Social Identity Theory of Intergroup Behavior. In:
870 Worchel, S. and Austin, W.G., Eds., *Psychology of Intergroup Relation*, Hall Publishers,
871 Chicago, 7-24.

872 Toma, S. G., & Hudea, O. S. (2024). Generation Z students' perceptions on the abilities, skills
873 and competencies required in the age of artificial intelligence systems. *Amfiteatru*
874 *Economic*, 26(65), 162-180. <https://doi.org/10.24818/EA/2022/59/46>

875 Trisca, L. (2025, January 31). *The complete guide to belonging at work: Foster an engaged*
876 *workplace*. Available online: <https://www.deel.com/blog/belonging-at-work/> (accessed on
877 July 6, 2025)

878 UBC Faculty of Forestry, Sharik, T., & Saracina, R. (2021). Regional assessment of forest
879 education in North America (Canada and the United States). FAO. Rome, Italy. Available
880 online: [https://openknowledge.fao.org/server/api/core/bitstreams/db8d6785-2ab1-4ad0-](https://openknowledge.fao.org/server/api/core/bitstreams/db8d6785-2ab1-4ad0-a60e-a9c75300c15f/content)
881 [a60e-a9c75300c15f/content](https://openknowledge.fao.org/server/api/core/bitstreams/db8d6785-2ab1-4ad0-a60e-a9c75300c15f/content) (accessed on February 18, 2025)

882 U.S. Bureau of Labor Statistics. (2024). *Median age of the labor force, by sex, race, and*
883 *ethnicity*. Available online: <https://www.bls.gov/emp/tables/median-age-labor-force.htm>
884 (accessed on 2 October 2024).

885 USDA Food and Agricultural Education Information System. (2022). Data Center. Available
886 online: <https://faeis.cals.vt.edu/data-center/> (accessed on 18 March 2025).

887 Vaccaro, A., & Newman, B. M. (2016). Development of a sense of belonging for privileged and
888 minoritized students: An emergent model. *Journal of College Student Development*,
889 57(8), 925–942. <https://doi.org/10.1353/csd.2016.0091>

890 Wagner, H. (2022). *We need more women in forestry: 'Who wouldn't want to work with trees?'*
891 Available online: [https://www.stateforesters.org/2022/03/31/we-need-more-women-in-](https://www.stateforesters.org/2022/03/31/we-need-more-women-in-forestry-who-wouldnt-want-to-work-with-trees/)
892 [forestry-who-wouldnt-want-to-work-with-trees/](https://www.stateforesters.org/2022/03/31/we-need-more-women-in-forestry-who-wouldnt-want-to-work-with-trees/) (accessed on 16 November 2024)

893 Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and
894 achievement. *Journal of Personality and Social Psychology*, 92(1), 82–96.
895 <https://doi.org/10.1037/0022-3514.92.1.82>.

896 Wasserman, L. H. (2010). The relationship between perceived preparedness, efficacy and special
897 education training. *Walden Dissertations and Doctoral Studies*. 813.

898 Westphal, L. M., Dockry, M. J., Kenefic, L. S., Sachdeva, S. S., Rhodeland, A., Locke, D. H.,
899 Kern, C. C., Huber-Stearns, H. R., & Coughlan, M. R. (2022). USDA Forest Service

900 Employee Diversity During a Period of Workforce Contraction. *Journal of Forestry*,
901 120(4), 434–452. <https://doi.org/10.1093/jofore/fvab071>

902 Westerman, J. W., & Yamamura, J. H. (2007). Generational preferences for work environment
903 fit: Effects on employee outcomes. *Career Development International*, 12(2), 150–161.
904 <https://doi.org/10.1108/13620430710733631>

905 White, J. (2018). *The Pitfalls of Generational Thinking*. Available online:
906 <https://www.resilience.org/stories/2018-05-17/the-pitfalls-of-generational-thinking/>
907 (accessed on 6 May 2025)

908 Yuval-Davis, N. (2006). Belonging and the politics of belonging. *Patterns of Prejudice*, 40(3),
909 197–214. <https://doi.org/10.1080/00313220600769331>.