

# New Zealand School of Forestry Survey of BForSc Graduates and Their Employers – summary of 2017 survey results

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## Abstract

The New Zealand School of Forestry (SoF) seeks to continuously improve the quality and relevance of its Bachelor of Forestry Science degree. In support of this ongoing effort, the SoF conducted in 2017 a survey of all recent graduates of that degree and their employers in forestry and allied sectors. The survey was designed to assess how well the degree prepares graduates for their professional careers and to gain insight into improving the educational experience offered by the SoF. This article summarises the key findings of that survey and offers suggestions for improving that degree, which is already held in high regard by graduates and employers alike.

## Background

In April 2017, the SoF conducted a survey of all recent Bachelor of Forestry Science (BForSc) graduates and their employers in forestry and allied sectors to: (a) assess the value of the degree in preparing individuals for professional careers; and (b) gain insight into opportunities for improving the degree programme. The survey focused on four key areas: knowledge base, technical skills, professional abilities and personal traits. These areas are well accepted as important in evaluating educational programmes in professional disciplines (e.g. Bullard et al., 2014; Fox et al., 1998).

The survey was designed to acquire employers' and graduates' perspectives about: (a) the importance in the work environment of these four areas; (b)

the competence level attained in these areas by BForSc graduates; and (c) the degree to which the SoF experience contributed to that competence. Surveys were sent electronically to 53 employers in 30 forestry sector organisations and to 107 recent BForSc graduates (2010–2016 inclusive). Sixty-four percent of employers responded, representing 77% of employer organisations, and 59% of graduates responded. Of the latter, 82% were employed in the forestry sector, 8% were employed in other professions and 6% were pursuing advanced education. (Sample sizes shown in figures reflect graduates employed in the forestry sector and exclude non-responses to questions.)

## Findings

### Graduate profile

The SoF has defined a desired graduate profile characterised by seven overarching abilities and traits it works to impart in its graduates. Seventy-five percent or more of employers agreed or strongly agreed that six out of the seven profile elements met their requirements (Figure 1), while over 80% of the graduate respondents agreed or strongly agreed that all seven do so (Figure 2). These results reveal general agreement that the profile is appropriate from both perspectives. It is noteworthy that the employers placed the highest importance on the ability to work effectively in a team, and that the three most strongly endorsed profile elements are not forestry-specific, but rather are abilities important in any profession.

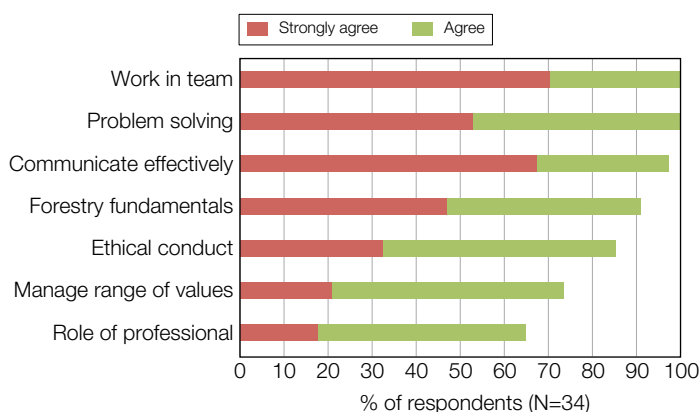


Figure 1: Employers' assessment of graduate profile

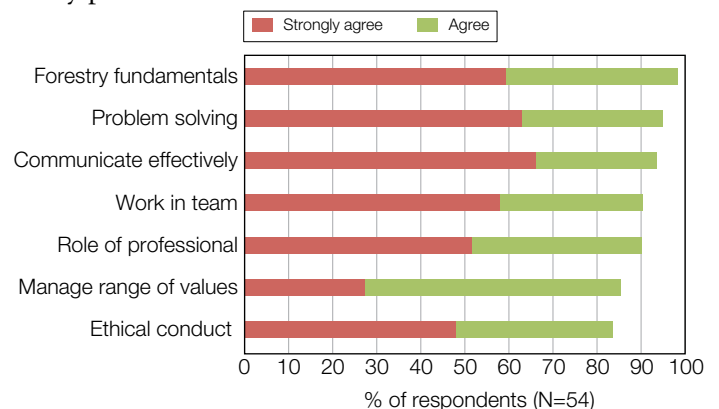


Figure 2: Graduate versus employer competence rating – knowledge base

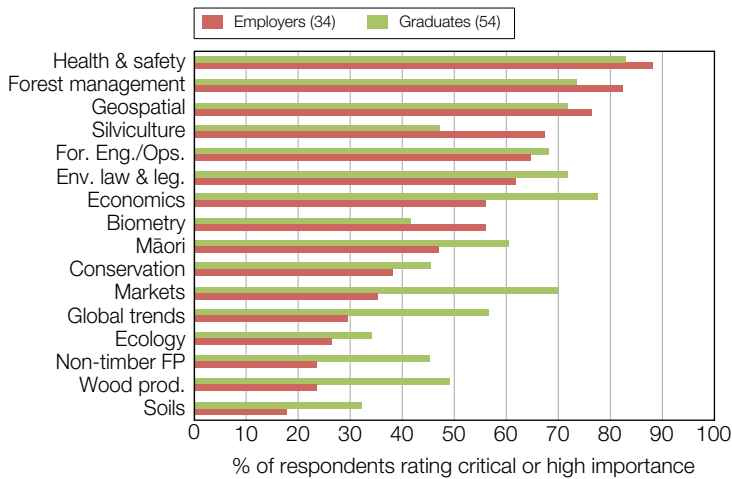


Figure 3: Graduate versus employer importance rating – knowledge base

## Knowledge base

Knowledge base was defined in the survey as the collection of 16 discipline-related subject areas comprising information the graduate knows, understands and can effectively apply in forestry practice. Leading the list, with near unanimity amongst employers, is the high importance placed on knowledge of health and safety (Figure 3). This was followed by forest management, geospatial technologies, silviculture, forest engineering and operations, environmental law and legislation, economics and biometry, all of which were rated as important by over 50% of respondents.

Like employers, graduates rated health and safety as the most important element in the knowledge base (Figure 3). This was followed closely by economics, forest management, environmental law and legislation, and geospatial technology.

In many cases, employers and graduates rated the importance of knowledge elements similarly (Figure 3). This is especially noticeable in elements of highest importance, namely, health and safety, forest management and geospatial technologies.

Employees were deemed fully or highly competent in 14 of the knowledge base subjects by less than 50% of employers, with only geospatial technology and forest management exceeding this level (Figure 4). Few employers assessed graduates as fully competent in any subjects.

Few graduates (<25%) deemed themselves fully competent in any elements of the knowledge base, which is understandable given their recent entry into the working profession (Figure 4). However, two-thirds or more of graduates deem themselves highly competent in four knowledge elements (i.e. geospatial technology, forest management, health and safety, and economics), all of which they rated as of critical or high importance (Figures 3 and 4).

Interestingly, graduates rated their competence generally much higher than did their employers (Figure 4).

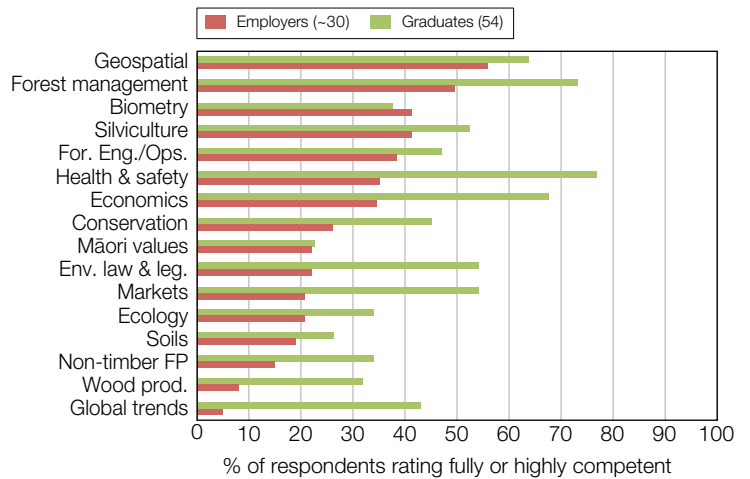


Figure 4: Graduate versus employer competence rating – knowledge base

This is most notable where nearly 80% of graduates deemed themselves to be fully or highly competent in health and safety; only one-third of employers agreed.

## Technical skills

Technical skills comprise those forestry-related capabilities one must possess to function competently as an effective forester.

Implementing health and safety protocols, conducting financial analysis, applying GIS, environmental management and monitoring, data analysis, and field sampling and measurements, top the importance list of technical skills (Figure 5) in the view of employers, over two-thirds of whom rate these as critically or highly important. Health and safety stands out, with 85% of respondents rating it of critical importance. With the exception of forest health and site quality assessment, all other skills are rated as highly or critically important by 40% or more of employers.

Graduates rate health and safety, financial evaluation, applying GIS, data analysis, and environmental management and monitoring, as the five most important technical skills (Figure 5). Use of LIDAR rates lowest, but still over one-third of graduates deemed it critically or highly important.

Less than 20% of employers ranked graduates as being fully competent in technical skills. In five areas (sampling and measurements, GIS application, GPS use, data analysis, and financial evaluation) graduates were rated as fully or highly competent by 50% or more of employers (Figure 6). In five other skills, relating to harvest systems, silviculture prescriptions, site assessment, road layout, and forest valuation, less than 25% of employers rated graduates as fully or highly competent.

As with knowledge base, graduates' and employers' ratings of importance are in close agreement. This is true both in absolute and relative terms, as graduates' and employers' assessments are remarkably similar in both the rating and ranking (Figure 5).

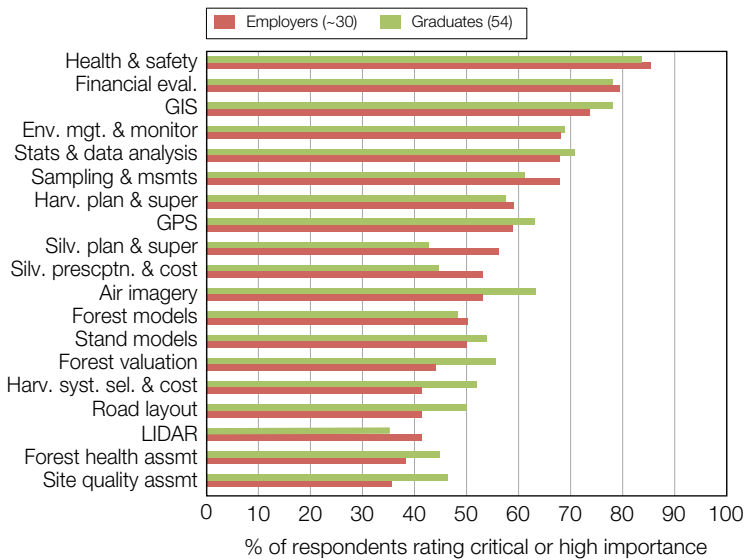


Figure 5: Graduate versus employer importance rating – technical skills

Level of agreement in competence, on the other hand, is mixed. Ratings and rankings are very similar for the five skills, with highest employer-assessed competencies being sampling and measurements, GIS, GPS, data analysis and financial evaluation (Figure 6). In other areas, notably health and safety, graduates rate their competence significantly higher than do their employers. This may reflect bias in self-assessments or the different performance benchmarks of the two parties.

## Professional abilities

Professional abilities comprise those generic, enabling abilities one must possess to function competently in any professional discipline. Almost all of the 13 professional abilities listed were deemed highly important by employers. However, communication stands out, with 100% of respondents deeming listening, writing and speaking as critically or highly important (Figure 7). Negotiation and leadership were deemed important by fewer employers, but still by two-thirds of them. Graduates were nearly unanimous in rating time management and problem-solving as most important (Figure 7).

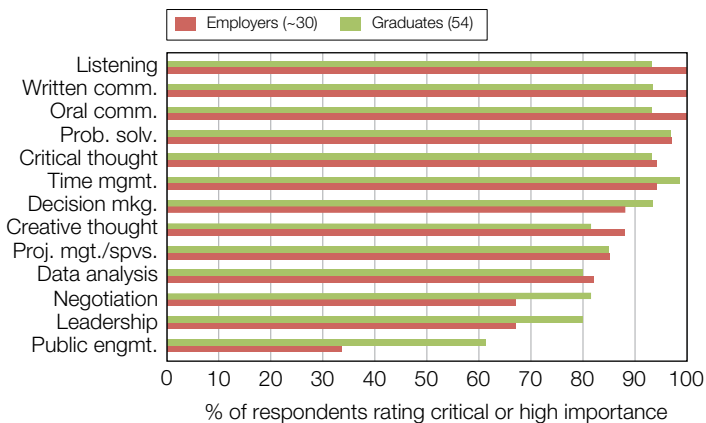


Figure 7: Graduate versus employer importance rating – professional abilities

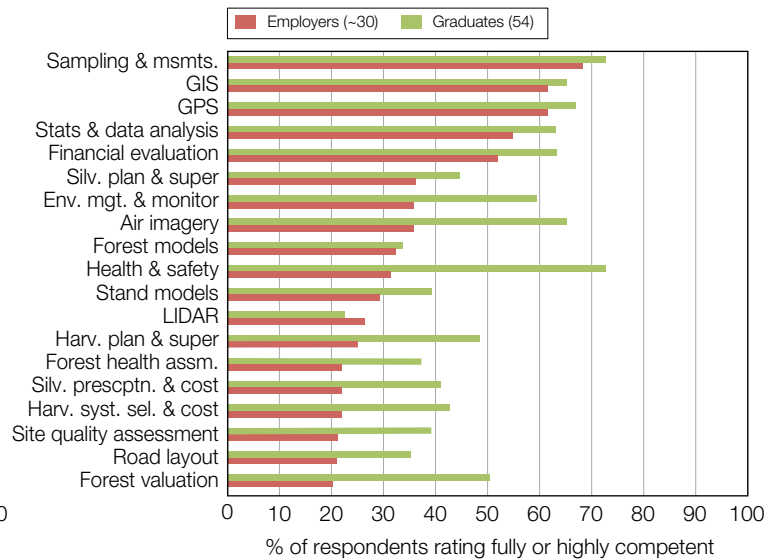


Figure 6: Graduate versus employer competence rating – technical skills

Graduates and employers assessed professional abilities almost identically, both in rating and ranking of importance (Figure 7). Only moderate variances were evident in the three lowest rated abilities (negotiation, leadership and public engagement), where graduates assigned higher importance than did employers. Interestingly, both employers and graduates placed overall higher importance on professional abilities than on forestry-specific knowledge and skills (Figures 3, 5 and 7).

Two-thirds of employers rated graduates as highly or fully competent in communication, data analysis, time management and problem-solving (Figure 8). However, very few employers (less than 20%) felt employees were fully competent in any of these professional abilities.

Graduates rated themselves most competent in problem-solving and written communication, with nearly 90% believing they are fully or highly competent in these areas (Figure 8). Competence in negotiation and public engagement were rated much lower, with about 55% of graduates believing themselves to be fully or highly competent in these abilities.

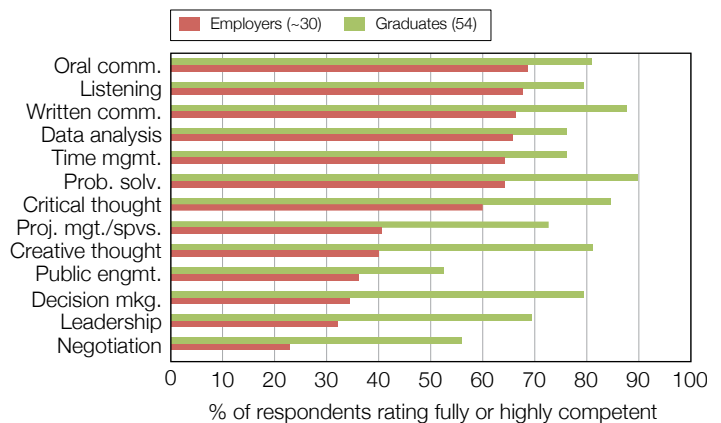


Figure 8: Graduate versus employer competence rating – professional abilities

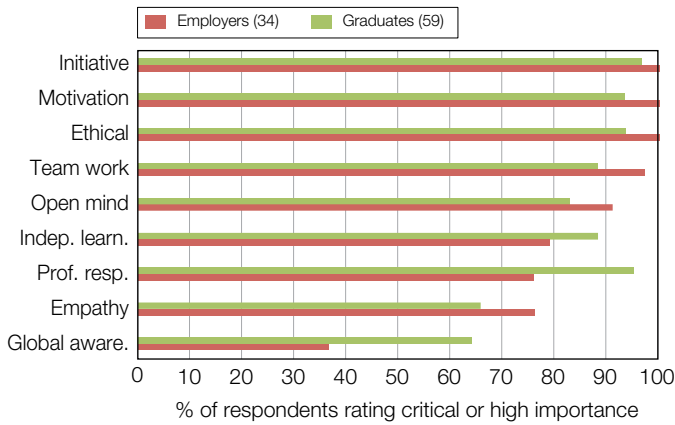


Figure 9: Graduate versus employer importance rating – personal traits

In all professional abilities, graduates see themselves as more competent than did their employers (Figure 8). This repeats the pattern seen with knowledge base and technical skills and, as suggested earlier, may reflect bias in self-assessments or the different performance benchmarks of the two parties, or both.

### Personal traits

Personal traits are characteristics of an individual, reflected in their behaviour, that are influential on their performance in a work setting. All employers rated ethical behaviour, motivation, initiative and team work as of high or critical importance (Figure 9). More than 90% of graduates rated initiative, professional responsibility, motivation and ethical behaviour as highly or critically important (Figure 9). Employer and graduate importance ratings were very closely aligned, with almost perfect agreement in the extreme importance of initiative, motivation and ethical behaviour (Figure 9).

Few employers felt that personal traits were fully developed in their employees, but 80% said that motivation and ethical behaviour were at least highly developed (Figure 10). Empathy, professional responsibility and global awareness were seen to be

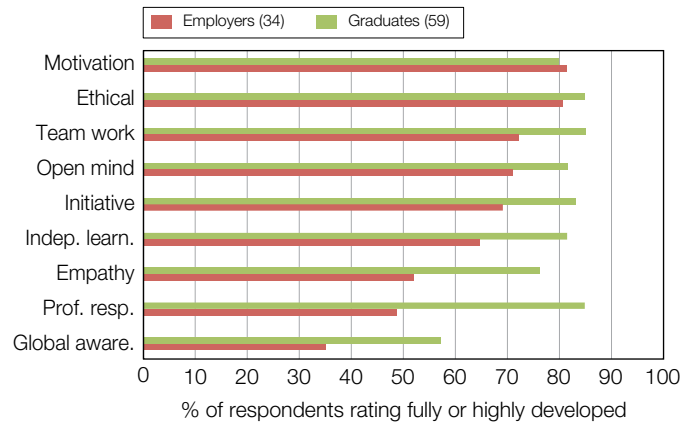


Figure 10: Graduate versus employer development rating – personal traits

least developed, as less than 50% of employers felt these traits were fully or highly developed in employees.

Graduates self-assessed their degree of development as relatively high in almost all personal traits. Over 80% of graduates felt their personal traits, save empathy and global awareness, were highly or fully developed (Figure 10). As with knowledge base, technical skills and professional abilities, graduates rate their development of traits higher than their employers do (Figure 10).

### Curriculum contribution

Graduates were asked to evaluate the contribution of the BForSc curriculum to their development in the four areas assessed in the survey. Graduates rate economics, forest management, forest engineering and operations, geospatial technology, and silviculture as the areas in which the curriculum made high or critical contribution to their knowledge base (Figure 11). The curriculum made the least contribution about health and safety, environmental law and regulation, global trends, and Māori values and culture.

Graduates generally deemed the curriculum to have made a significant contribution to their competence in almost all technical skills. In all but three skills, over half the graduates rated the curriculum as making a critical or high contribution (Figure 12). Health and safety, rated lowest, again stands out.

Regarding professional abilities, it is noteworthy that graduates rated curriculum contribution to their competency greatest in written communication (Figure 13). This may signal the productive consequence of the SoF's recent initiative to systematically and rigorously emphasise writing and to progressively build on it through a selected series of papers across the curriculum.

The curriculum supports little student development in leadership, negotiation and public engagement. While these generally ranked low in importance relative to other abilities, they were nonetheless deemed important by a majority of graduates and over one-third of employers (Figure 7).

Of the personal traits, graduates rated the curriculum as contributing most to independent

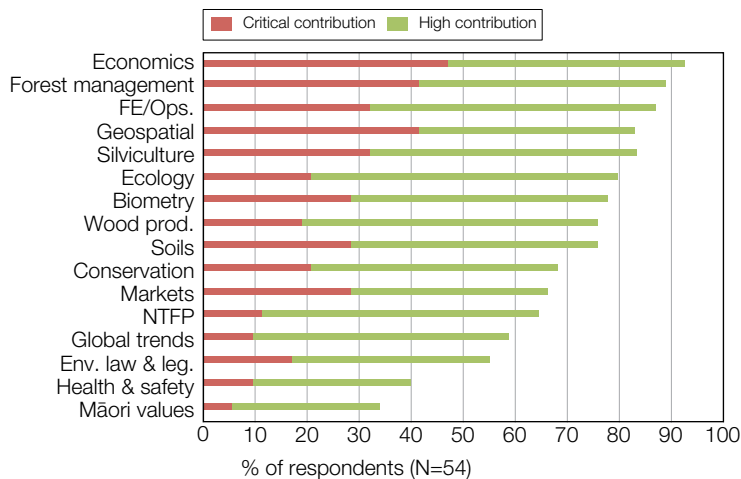


Figure 11: Graduate: curriculum contribution rating – knowledge base

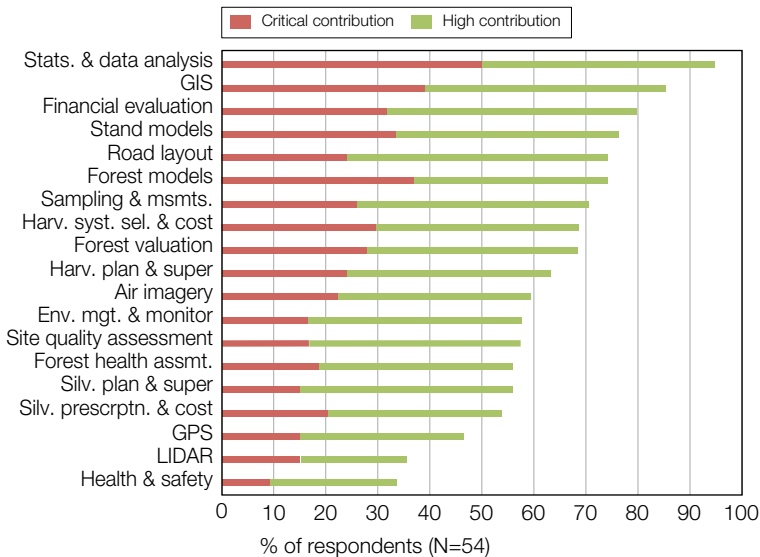


Figure 12: Graduate contribution rating – technical skills

learning and team work and least to open-mindedness and empathy (Figure 14). Of the four areas assessed in the survey, the curriculum was viewed as contributing least to personal traits. This is not surprising given that development of personal traits is strongly driven by one’s upbringing, general life experiences, and a myriad of other factors outside the academic environment.

### Extra-curricular experiences

Student development is affected by more than the curriculum proper, and graduates were asked to identify extra-curricular experiences that made significant contributions to their personal and professional development.

Three important experiences were cited most commonly. Field trips, social interaction, and holiday and summer work experience were deemed very important by approximately 50%, 40% and 30% of the respondents, respectively. Social interaction was described as being fostered by FORSOC (the students’ forestry society), small class sizes, the open computer lab, and the generally high level of camaraderie at

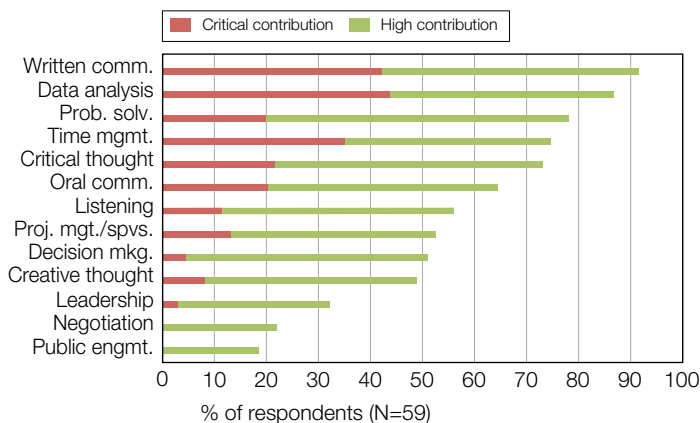


Figure 13: Graduate: degree contribution rating – professional abilities

the SoF. Close interaction with working professionals, in guest lectures and field trips, was also deemed a highly important element in graduates’ educational experience.

Overall, the responses strongly suggest the importance graduates placed on having a strong social bond, on being fully exposed to the practical and real-life aspects of forestry as a profession, and on becoming part of that profession through relevant work experience and direct interaction with working professionals.

### Suggestions for improvement

In addition to the Likert-formatted questions, graduates and employers were asked various open-ended questions to solicit their views about a variety of matters relating to important abilities, areas of strength and weakness in graduates, and to obtain thoughts or suggestions for improving the quality of the degree and learning experience at the SoF.

While there existed much variation in comments given the various perspectives, interests and professional environments of the employers and graduates, there were several suggestions that were commonly voiced. These fell into two general categories and are offered for consideration by the SoF and forestry community:

### Student engagement in the profession and awareness of keys to success

- Increase marketing initiatives and more fully reveal the breadth of forestry employment opportunities to recruit to the SoF individuals in greater number and with a wider variety of interests
- Beginning early in the degree, and continuously throughout, endeavour to increase students’ engagement in the forestry profession and elevate their appreciation of keys to professional success
- Alert incoming students to the skills, abilities and important characteristics identified by employers and recent graduates, perhaps using some of the 2017 survey results to emphasise the message

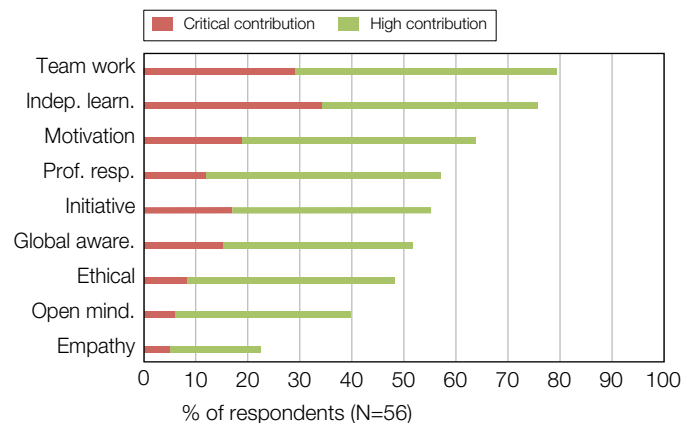


Figure 14: Graduate: degree contribution rating – personal traits



- Regularly hold formal and informal sessions where recent graduates and employers engage with students, especially in the early years, and discuss:
  - what is important for success in the profession
  - what they found valuable to derive maximum benefit from their time enrolled at the SoF
  - the breath of employment opportunities and the importance of gaining forestry work experience while a student.
- Increase the 90 day requirement for practical work experience and actively engage with industry to increase students' pre-graduation employment opportunities and participation.

## Curriculum content

- Either through the formal curriculum, or extra-curricular initiatives, explore means by which to increase student exposure to and working knowledge of:
  - health and safety legislation and protocols
  - environmental law and regulation as they affect forest practice
  - Māori values and interests in relation to forestry
  - effective team work, conflict resolution, negotiation and other aspects of human dynamics in the working environment
- Incorporate in curriculum papers across all years greater use of problem-based exercises purposefully designed to require application of forestry knowledge, independent thinking and analytical tools
- Incorporate communication, problem-solving and time management more fully in courses across the curriculum
- Use the current pedagogical approach to written communication as the model and apply it to strengthen other professional skills, including oral communication, data analysis (with Excel and other analytical tools) and team work
- Evaluate alternative designs of the year one curriculum with objectives to:
  - increase the value of papers, particularly science foundation papers
  - engage students in more hands-on, problem-based forestry exercises with learning outcomes

for both technical skills and professional abilities (e.g. writing, team work).

## Final points

Several overarching messages come out of the 2017 survey responses. First, the relatively high response rate signifies the forestry community's deep interest in, and support of, the SoF BForSc degree and its importance to the sector and the profession.

Second, the SoF graduate profile provides a general educational direction deemed appropriate for contemporary forestry by both employers and recent BForSc graduates working in the profession.

Third, the importance of helping students develop professional abilities cannot be over-emphasised, and these abilities warrant explicit inclusion and purposeful treatment in the SoF educational objectives alongside those that are forestry-specific in nature.

Fourth, encouraging and supporting student engagement in practical work experience and direct interaction with professionals during their undergraduate years is important to help connect them to the profession and to better prepare them for employment on graduation.

Finally, graduates and employers are strongly supportive of the SoF and its educational mission. Their collective responses provide every reason for the SoF to feel confident that it offers a very high quality degree. The thoughtful input from both parties also revealed opportunities for the SoF to make this highly regarded degree even more valuable to both its graduates and the New Zealand forestry sector.

## References

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