RICHTMANN
PUBLISHING

Assessing the Level of Work Preparedness of Final-Year BSc Quantity Surveying Students at University of Rwanda

Nathan Kibwami[1]

Phillipe Mugiraneza[1]

Alex Ndibwami[2]

Didier Sheja[1]

[1]*Department of Construction Management,*
College of Science and Technology,
University of Rwanda, Kigali, Rwanda
[2]*Directorate of Teaching and Learning Enhancement,*
College of Science and Technology,
University of Rwanda, Kigali, Rwanda

Abstract

The overarching vision of Higher Learning Institutions that are concerned with construction education, is to nurture graduates that will be prepared to not only deal with the current needs of the Construction Industry, but also be able to immerse themselves confidently in a future full of complexity. However, the transition from University to work is often a daunting experience for graduates, and employers often complain that graduates are usually ill prepared for work. It is therefore important to understand the students' perspective regarding level of work preparedness so that solutions can be sought, both from Universities and Industry, to make the transition from University to the world of work a truly empowering experience. This study investigated the level of preparedness to start work for final-year students (2019/20) pursuing a Bachelor of Science degree in Quantity Surveying (QSg) at University of Rwanda. An online questionnaire was designed and administered to 59 students to solicit their perceptions. Most students (42%) asserted that they were very prepared to start working as Quantity Surveyors, with some (12%) extremely prepared. Industrial Training stood out as the largest contributor in preparing students to start work, whereas University laboratory resources did not contribute much. Students exhibited most knowledge in core QSg competences, such as Estimating Costs of construction works. Although students were most confident in topics on Measurement of Finishes, students that had a Technical and Vocational Education and Training background exhibited greater confidence. The findings of this study provide important feedback for similar construction programs to evaluate and revise their curricula to better prepare QSg students for professional success in the Construction Industry.

Keywords: Higher learning institutions, quantity surveying, Rwanda, construction education, work preparedness

1. Introduction

The expectation to access better employment opportunities is one of the foremost reasons for enrolling for University education (García-Aracil et. al, 2018). As such, Higher Learning Institutions

(HLIs), such as Universities, are persistently challenged to engender graduates that fulfil the expectations of their respective employment pathways. Leading institutions are those that adequately prepare their graduates better for future professional employment life (Manakil & George, 2015). However, for students, the transition from being a student to a practicing professional can be "exciting and daunting" (Guner, 2014, p.845). Therefore, research into understanding students' perceptions regarding their level of preparedness to start work is important because it can feed into curriculum development and pedagogical improvements (Agllias, 2010), and further contribute to a smoother transition between University education and the world of work. Quantity Surveying (QSg) education is no exception as it should as well benefit from curricula reviews to meet industry expectations, especially by ensuring that all competencies expected of a graduate are sufficiently addressed (Yogeshwaran et. al, 2018).

A number of studies have been carried out to assess students' preparedness for work. Although these studies have taken place mostly outside Rwanda, and are not related to QSg, some important pointers to student work preparedness can be gleaned. Agllias (2010) carried out a study to assess Social Works students' preparedness for social work practice in Australia. The study suggested that Social Works graduates had a realistic understanding of challenges they would face in practice, and it identified a number of areas that the Social Works curricula had to address. A Portuguese study explored factors contributing to postgraduate students' perception of their preparedness to transition from University to the world of work (García-Aracil et al., 2018). The study concluded that theoretical, practical, methodological and employability competencies were key to understanding the students' perception of their preparedness for work life. A study in Turkey assessed Nursing students' preparedness for work and found out that students that had a vocational training background were more prepared for work (Guner, 2015). These studies suggest that on any programme, assessment of students' preparedness for work is an important strategy in devising ways of making students' transition from University to the workplace, both a rewarding and as much as possible, seamless experience.

Although the QSg degree has existed at the University of Rwanda (UR) for 11 years now, no studies have ever been carried out to assess the students' preparedness for work. As such, over the years, there has been insufficient basis for improving the employability of QSg graduates for the Rwandan industry and beyond. This especially comes at a time when alongside key allied professions, the Commonwealth Association of Surveying and Land Economy have jointly mapped existing gaps among key professions and are now interrogating different ways of overcoming these capacity challenges. As such, the Commonwealth Association of Architects, the Commonwealth Association of Planners, and the Commonwealth Local Government Forum, with support from The Prince's Foundation, the Rwandan Ministry of Infrastructure, the Rwandan Ministry of Local Government, the Commonwealth Association of Surveying and Land Economy, the Commonwealth Engineers Council and others, have been working together to promote a Call to Action on sustainable urbanisation in the Commonwealth (Commonwealth Sustainable Cities, 2020). The question thus on whether young students on the QSg programme are actually ready to immerse themselves in the world of work in view of the recognised gaps among professionals becomes even more critical. The aim of this study was therefore to assess the level of preparedness to start work, focussing on final-year students pursuing a Bachelor of Science degree in QSg at University of Rwanda, during the academic year 2019/20.

2. The Quantity Surveying Profession

There are several closely related accounts on the background to the practice and profession of QSg, the most prominent are from authors in the United Kingdom. Williams (2016) links the profession to formalized measurement, dating back to the Middle Ages with records of Royal expenditure on building work at the time of King Henry II (1154–1189), with later records of what appear to resemble Bills of Quantities (BoQs) appearing in Ireland in 1750. Seeley & Winfield (2009) assert that the first

method of measurement was only produced in Scotland in 1802 and there are firm indications that the system of measure and value on completion was used for most of the nineteenth century. It is also argued that Henry Cooper, son of a Master Builder, set up the first QSg Practice in Reading, England in 1785, followed by a London office in 1799 that dealt with measurement and the cost aspects of building works as the mid-19th century saw the use of 'measurers' or 'master tradesmen' (Towey, 2012).

The migration of professionals from England has seen the transfer of knowledge and the teaching of techniques on an international scale with global expansion of the QSg profession. This expansion has created QSg institutions in a number of countries, often with reciprocal agreements in place where each recognizes the other's qualification. Cartlidge (2011) asserts that the Quantity Surveyor (QS) has been an integral part of the construction industry for over 170 years, with their golden age being the period between 1950 and 1980 when BoQs were "generous and unchallenged". However, the QSg profession has evolved over time due to a number of factors including: information technology revolution; demand by clients for demonstrated added value; blurring of the distinction between contracting and professional service organizations (Cartlidge, 2011). In an attempt to rise to the challenges above caused by such evolution, the practice and procedure for the QS has been diversified from the production of BoQs and final accounts to a much wider range of activities and sectors where the QS is active and is becoming more diverse, including among others, project management, sustainability assessment, facilities management and value management.

3. Education and Training of Quantity Surveyors

The education and training needs of QSs have been a subject of conflicting positions by key stakeholders. For instance, academics are usually interested in producing a rounded graduate with foundational knowledge for further development, whereas the industry often looks for a graduate who can contribute immediately both to the daily functions of business and to its growth (RICS, 2011; Perera et al., 2011). The QSg profession demands a number of skills and competences for one to practice competently as a QS; these range from the Traditional Measurement Skills, Construction Economics, Construction Law, Cost Control and the like, to contemporary Building Information Modelling, Sustainable Construction, Business Administration, and others (Yogeshwaran et. al, 2018). Perera (2006) argues that the existing trends in employment suggest that majority of new QSg graduates are finding work more in non-traditional QSg routes, such as main contracting and specialized subcontracting organizations, as opposed to private consulting practices and the public sector, yet much of the academic content being taught relates more to the traditional roles. This perhaps is the cause of the apparent mismatch between the expectations of the Construction Industry, regarding the competences that graduate QSs should have, and what they actually have (Yogeshwaran et. al, 2018).

Professional institutions usually establish competencies for qualifying their QSg members and in this case, the Royal Institution of Chartered Surveyors (RICS), a global leading professional institution for QSs sets various competencies for QSs. Competency can be defined as the ability to perform the activities within an occupation to the standard expected for employment (AIQS, 2012). RICS competencies are arranged into three sections, depending on their perceived relevance to the role of a QS (See Table 1). Mandatory competencies cover personal, interpersonal, professional ethics and business skills whereas Core competencies are the primary skills related to QSg practice. The optional competencies are an additional set of requirements, supplementary to the primary skills, but with an element of choice depending on the specialisation of an individual. In addition, there are three possible levels of attainment for each competence where: Level 1 covers the theoretical knowledge; Level 2 covers the knowledge and practical experience; and Level 3 is about a combination of knowledge, practical experience and capacity to advise. It would be expected that a graduate QS should have some measurable understanding of these competencies, at least at a theoretical level.

Table 1: RICS recommended competencies and skills of Quantity Surveyors

Mandatory Competencies
1. Ethics, rules of conduct and professionalism, Level 3
2. Client care, Level 2
3. Communication and negotiation, Level 2
4. Health and safety, Level 2
5. Accounting principles and procedures, Level 1
6. Business planning, Level 1
7. Conflict avoidance, management and dispute resolution procedures, Level 1
8. Data management, Level 1
9. Sustainability, Level 1
10. Diversity, inclusion and team working, Level 1
11. Inclusive environments, Level 1
Core competencies
1. Commercial management (of construction works) or Design economics and cost planning, Level 3
2. Construction technology and environmental services, Level 3
3. Contract practice, Level 3
4. Procurement and tendering, Level 3
5. Project finance (control and reporting), Level 3
6. Quantification and costing (of construction works), Level 3
Optional competencies, any two at Level 2
1. Capital allowances
2. Commercial management (of construction works) or Design economics and cost planning – whichever is not selected as a core competency
3. Conflict avoidance, management and dispute resolution procedures or Sustainability
4. Contract administration
5. Corporate recovery and insolvency
6. Due diligence
7. Insurance
8. Programming and planning
9. Project feasibility analysis
10. Risk management

4. QS Training in Rwanda

4.1 Origin of QSg training in Rwanda

At the time of this study, in Rwanda, the Bachelor of Science program in QSg was running under the Department of Construction Management (DCM), in the School of Architecture and the Built Environment (SABE), at the College of Science and Technology (CST). The DCM was founded in January 2010 in what was then the Faculty of Architecture and Environmental Design (FAED), now SABE. The DCM was started in order to deal with a developing demand for highly skilled and versatile construction professionals in a booming construction sector in Rwanda. The programme was thus aimed at training professional QSs in a bid to bridge the existing gap in the Construction Industry in Rwanda. Graduates from the department would find employment in government institutions, public parastatals, financial institutions, consultancies or eventually go ahead to start their own practices. In the first cohort (2010 – 2011), 44 students were admitted for the BSc QSg, of whom 39 went on to graduate in July 2013, making history as the first Rwandan-trained QSs.

Students on the BSc QSg program typically undergo a focused four-year education and training process that equips them with vital tools and skills to add value to the professional landscape of the Rwandan Construction Industry. The BSc QSg program does not detract from what is expected of QSg training as stipulated under the RICS recommended competencies and skills of QSs, including: preparation of BoQs, Construction Cost Estimation, Taking off quantities of Materials, Plant and

Labour, Cost Planning, Procurement of Construction Works, Valuation of Construction Works, Contract Administration, Dispute Resolution, Value Engineering and Management, Cost Control, Facilities Management and Loss Assessment for Insurance and Compensation Works. A summary of modules offered across the four years of the BSc QSg is provided in Table 2.

Table 2: Summary of modules for the four-year BSc Quantity Surveying Program

Semester/Year	Year 1	Year 2	Year 3	Year 4
Semester 1	ICT Skills	Statistics for Quantity Surveying	Industrial Attachment I	Industrial Attachment II
	Economics	Measurement of Construction Works I	Computer Applications for QS	Measurement of Building Services
	Introduction to Architectural Presentation	Tort, Property & Commercial Law	Structural Design II	Civil Engineering Construction Technology
	Principles of Law	Construction Technology II	Measurement of Construction Works III	Tendering and Estimating
	Mathematics for Engineers I	Building Materials II	Financial Accounting	Research Project I
	English for Specific Purposes I	Introduction to Land Surveying	Building Services I	
		English for Academic Purposes I	Construction Management I	
Semester 2	English for Specific Purposes II	English for Academic Purposes II	Measurement of Construction Works IV	Measurement of Civil Engineering Work
	Mathematics for Engineers II	Measurement of Construction Works II	Construction Management II	Contract Administration
	Building Materials I	Structural Design I	Building Services II	Professional Practice
	Fundamentals of Development	Building Economics I	Building Economics II	Research Project II
	Environmental Studies	Principles of Management	Research Methods	
	Strength of Materials	Construction Technology III	Entrepreneurship	
	Construction Technology I	Law of Contract		

4.2 QSg Students portfolio

In 2019/20, the DCM had a total number of 211 students across the four years, with an average of 1:4 gender split. The percentage intake of female students has gradually been increasing and generally, since inception of the programme, the total intake has been on the rise, which further justifies relevance of the programme to the nation. Tables 3 and 4 show statistics of distribution of registered students across the four years of the program (2019/20), and over the last 10 years (2010-2020), respectively. However, absence of research on the graduates' level of preparedness to start work limits the potential of improving the employability of the graduates since little is known about the students' perceptions before and after graduation. The present study is a first step to address this gap.

Table 3: Registered students for academic year 2019/2020

	Female	Male	Total per Year
Year 1	7	47	54
Year 2	11	46	57
Year 3	9	32	41
Year 4	20	39	59
Total	**47**	**164**	**211**

Source: Department of Construction Management (2020)

Table 4: Registered students from 2010 to 2020

Academic year	Total Number of Registered Students	Graduates per Year
2009/2010	40	-
2010/2011	67	-
2011/2012	100	-
2012/2013	137	39
2013/2014	130	27
2014/2015	133	33
2015/2016	147	37
2016/2017	151	33
2017/2018	175	27
2018/2019	202	47
2019/2020	211	-
Total		**241**

Source: Department of Construction Management (2020)

5. Methods

The entire research population, which included 59 students (i.e. Final year QSg students 2019/20) was considered for the study. Kervin (1992) suggests that in such a situation where the entire research population is considered for a study, sampling is not necessary but rather, enumeration should be used. This study followed a similar approach of enumeration. An online questionnaire, composed of close-ended questions, was employed to collect data, using Google forms. The responses collected were anonymous to ensure confidentiality of students' information. The questions were designed to capture a number of themes that could elicit the student's preparedness to start work. This structure of questionnaire has successfully been used before in similar studies (see Guner 2014, Manakil & George, 2015) and as such, was found suitable.

The questionnaire was composed of 11 questions arranged in four parts. The first part contained six questions related to demographic data. The second part contained two questions, one to assess which key QSg competencies the students were most knowledgeable in, and another question assessing how confident they felt regarding key QSg knowledge areas they learnt during the course of the program. This question was answered based on the 5-point scale (Not at all confident, Slightly confident, Moderately confident, Very confident, and Extremely confident). Cronbach's alpha was used to test internal consistencies of self-perceived confidence in the knowledge areas listed; Cronbach values normally range from 0 to 1, with higher values indicating greater internal consistency, and ultimately, reliability (DeVellis, 2017). The third section of the questionnaire assessed the extent to which various aspects within the learning environment, such as Library and Laboratory resources, might have helped students get prepared to start work. The response options were also based on a 5-point scale (Not at all, To a small extent, To some extent, To a moderate extent, and To a large extent). An option of "Not Applicable" was included to cater for some answer options (e.g. having a part-time job) that were not expected to apply to all respondents.

The last section of the questionnaire contained two questions, one tasking the respondents to rate their preparedness/readiness to start working as QSs (Not at all prepared, Slightly prepared, Moderately prepared, Very prepared, and Extremely prepared) and an open-ended question to solicit opinions on how they could be better prepared to work.

The analysis of the data catered for both quantitative and qualitative data gathered from closed and the open-ended questions, respectively. For quantitative questions, elementary descriptive statistics and chi-square tests of association were used to analyse the data, and results were presented in form of tables and graphs (Field, 2013). For the open-ended question that generated qualitative

data, qualitative data analysis techniques were employed. This involved use of a framework matrix where data were summarized in a table of rows and columns in order to allow for both cross-case analyses and as well as sorting data by themes (Bazeley & Jackson, 2013). Results from qualitative data were used to augment those obtained from the quantitative data.

6. Results and Discussions

6.1 General overview of responses

Of the 59 students in the 2019/20 cohort, 50 students (85%) responded to the survey and of these, 66% were male, whereas 34% were female. These gender statistics matched those of the research population, suggesting that the collected sample was adequately representative of the whole 2019/20 cohort. The respondents' education background, before joining University, is presented in Table 5. Majority of the students had a Technical and Vocational Education and Training (TVET) background. This can be explained by the fact that, students from TVET have limited programme options to progress in Rwandan Universities. As such, in a few University programmes like QSg that can admit TVET students, such students are usually favoured in the admission process, leading to proportionately larger numbers admitted.

Table 5: Education background of respondents

S/N	Subject combination/specialty	Percentage of responses (%)
1	PCM (Physics, Chemistry and Mathematics)	20.00
2	MPG (Mathematics, Physics and Geography)	20.00
3	MPC (Mathematics, Physics and Computer science)	8.00
4	PEM (Physics, Economics and Mathematics)	2.00
5	MEG (Mathematics, Economics and Geography)	4.00
6	TVET (Technical and Vocational Education and Training)	46.00
	Total	**100.00**

Regarding knowledge of the QSg profession, of the 50 students that participated in the study, more than half (52%) hardly knew of the QSg profession before joining University. This finding is similar to that in Olweny (2017) where it was found that prospective students to an Architecture program in Uganda were unaware of the role of Architects. This suggests a need to improve the awareness of programmes, in this case the QSg programme, beyond the confines of the University.

Fifty two percent (52%) of the students indicated that they look forward to opening their own practices but majority (94%) preferred not to do this immediately, rather after accumulating some years of practice. A chi-square test suggested a statistically significant relationship (n=50, df = 5, p= 0.038) between the students' education background and desire to own practices upon graduation. Majority (65%) of the students who desired to open practices had a TVET background (see Table 6). In addition, male students (84.62%) were more likely to start their own practices, than their female counterparts (n = 50, df = 1, p = 0.004).
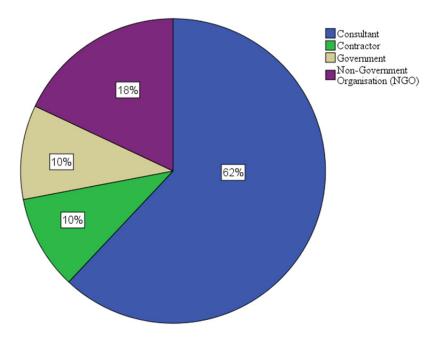
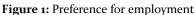**Table 6:** Impact of education background on starting own practice

Subject combination/specialty	After you graduate, will you open/start an independent (your own) company?		Total
	Yes	No	
PCM (Physics, Chemistry and Mathematics)	3	7	10
MPG (Mathematics, Physics and Geography)	5	5	10
MPC (Mathematics, Physics and Computer science)	0	4	4

PEM (Physics, Economics and Mathematics)	0	1	1
TVET	17	6	23
MEG (Mathematics, Economics and Geography)	1	1	2
Total	**26**	**24**	**50**

Majority (62%) of the students (see Figure 1) preferred to start their work experience in Consultancy firms. It could be asserted, from this finding, that the current program needs to be updated so that it can prepare students to diversify the evolving roles of QSs. Yogeshwaran et. al (2018) support this assertion by opining that in QSg education systems, priority should be given to modules concerned with evolving fields such as Construction Information Technology, Building Information Modelling (BIM), and Sustainability.

Figure 1: Preference for employment

6.2 Knowledge in QSg aspects

Students were asked to indicate a maximum of five aspects of QSg (out of the nine listed) they considered to be most knowledgeable about. The aspects, which were mapped into RICS classification of competencies (see Table 1) - Mandatory, Core, and Optional - were gleaned from key modules (See Table 2) students are taught in the QSg program. The most selected QSg aspect was *Estimating Costs of Construction Works* (68%), which relates to a core competency as defined by RICS (see Table 7). Generally, students indicated and thus exhibited most knowledge in Core competences, followed by Mandatory and lastly, Optional Competencies. This suggests that the QSg program largely focused more on the core competencies of QSg. In order to make the program more compatible with RICS, Mandatory competency-based modules need to be introduced and/or integrated in the curriculum.

Table 7: QSg aspects in which respondent are most knowledgeable

S/N	Knowledge item	Count by Ranking	RICS classification
1	Estimating costs of construction works	34	Core
2	Measurement of construction works	30	Core
3	Tendering for Construction works	28	Core
4	Team working	22	Mandatory
5	Construction contract administration	22	Optional
6	Sustainability issues in construction	18	Mandatory
7	Communications skills (e.g. self-expression)	15	Mandatory
8	Helping to settle disputes	11	Optional
9	Insolvency in construction works	5	Optional

There was a significant difference (n = 50, df = 1, p = 0.034) between Knowledge in the QSg aspect of *Tendering of Construction Works* and gender. Majority of students most knowledgeable in this aspect were male (78.57%). Meanwhile, majority (60.71%) of the students who were confident in the aspect of *Tendering of Construction Works* had a TVET education background.

6.3 Self-perceived confidence in key QSg module topics

Cronbach's alpha value was 0.960, indicating good internal consistency and reliability for the sixteen items considered in gauging the self-perceived confidence in key QSg module topics. Averagely, students with TVET background exhibited greater confidence across the items, whereas female students were lesser confident than their male counterparts. Generally (see Table 8), of all the listed topics, students were most confident in *Measurement of Finishes* (Mean = 3.90) and least confident in *Describing the Essentials of a Construction Contract* (Mean = 3.06).

Table 8: Self-perceived confidence in key QSg module topics

S/N	Item	1 Not at all confident (%)	2 Slightly confident (%)	3 Moderately confident (%)	4 Very confident (%)	5 Extremely confident (%)	Mean
1	Measurement of Building Services	12	14	36	24	14	3.14
2	Building materials	4	12	18	46	20	3.66
3	Measurement of civil engineering works	16	8	40	20	16	3.12
4	Measurement of Excavations and Earthworks	6	14	16	30	34	3.72
5	Measurement of Finishes (e.g. painting, tiles, etc)	6	6	18	32	38	3.9
6	Measurement of complex concrete structures	6	14	32	22	26	3.48
7	Measurement of doors and windows	4	12	22	22	40	3.82
8	Preparation of Bill of Quantities	4	14	18	44	20	3.62
9	Knowledge in various Construction technologies	4	20	22	30	24	3.5
10	Building up rates for construction	6	20	26	36	12	3.28
11	Preparing cost estimates	6	24	20	34	16	3.3
12	Preparation of tender documents	4	18	34	32	12	3.3
13	The various parties in a construction project	8	12	36	24	20	3.36
14	Interpreting clauses of construction contracts	12	22	28	14	24	3.16
15	Describing the essentials of a construction contract	14	20	28	22	16	3.06
16	Preparation and presentation of a research project	8	16	24	36	16	3.36

6.4 Preparedness to start work

Regarding the general level of preparedness/readiness to start working as QSs, the results were as follows: Not at all prepared (2%), Slightly prepared (6%), Moderately prepared (38%), Very prepared

(42%), and Extremely prepared (12%). Chi-square tests suggested no significant relationship between the level of preparedness to start work and gender (n = 50, df = 4, p = 0.466). Meanwhile, there was also no significant difference in the level of preparedness to start work and education background (n = 50, df = 20, p = 0.880). This finding contrasts with observations in Guner (2014), where Turkish Nursing students that had a vocational education background before joining university, felt better prepared to start work.

Table 9 presents results regarding the extent to which the students considered various environmental factors had helped them prepare for the world of work. A big percentage of students did not consider *University Laboratory resources* to have prepared them for work since majority (36%) thought this factor was even not applicable to them. This finding suggests that the present curriculum is deficient in laboratory work. In fact, SABE lacks a dedicated laboratory or workshop and anecdotal evidence points to superficial attempts to make do with laboratory/workshop facilities in the neighbouring School of Engineering. Meanwhile, half of the respondents agreed that their instructors contributed to a large extent in the preparedness for work. This suggests that instructors' interaction with students, such as during mentorship sessions, contributes to students' preparedness to work. An overwhelming majority (66%) concurred that Industrial Training attachment contributes to a large extent in preparing them to start work. As such, QSg programs ought to invest in Industrial Training attachment as an important factor in preparing students to start work.

Table 9: Assistance in preparation to start work

S/N	Factor	Extent to which a factor has helped to prepare start work					
		Not applicable (%)	Not at all (%)	To a small extent (%)	To some extent (%)	To a moderate extent (%)	To a large extent (%)
1	University Library resources	8	20	32	14	20	6
2	University Laboratory resources	36	28	20	8	8	0
3	Your Instructors	2	4	6	12	26	50
4	Industrial Training attachment	2	4	2	10	16	66
5	Part-time jobs	22	14	8	12	20	24
6	University administration	10	20	18	20	22	10
7	Student associations	6	16	16	14	24	24
8	Former students	4	14	12	26	28	16

Students were asked to indicate what could be done by the University to improve their level of preparedness to start work. Thematic analyses show that the key emerging themes included: improvement in teaching methods, emphasising industrial training, and implementing professional internships. Excerpts supporting these themes are summarised in Table 10. Overall, results suggest that students perceived a greater focus on practical content has a positive impact on their perceptions of improving the level of preparedness to start work.

Table 10: Emerging themes in improving work preparedness

S/N	Theme	Examples of supporting excerpt extracted verbatim
1	Improvement of teaching methods	• Increase the level of teaching using practically examples and working
		• Increase practice by giving students the applicable projects starting from level 2 if it is measurement take one university building plans and practice
		• Increase exercises about cost estimations
		• Provide more practical courses less theories and expose students to projects that are related to what they have learnt in class to emphasize lessons in practical
		• Provide software trainings
		• The university should try and help student to be engaged in reality since this professional is more of practice than theory

S/N	Theme	Examples of supporting excerpt extracted verbatim
2	Emphasis on Industrial training	• Give placement to their graduates in volunteering organizations or NGO to apply sustainability related construction issues • To allocate students in industrial trainings. • To increase time for industrial training • More efforts in industrial attachments • Providing industrial attachments and workshops at every level, for students to be very familiar with their career at earlier time and to expose them to work conditions earlier. • Searching the training for student • Helping students to get industrial attachment related to the quantity surveying
3	Implementation of Professional internships	• Helping the final year student to get professional internship • We need more practice and even professional internship • Help students to get opportunities to professional internship or jobs offers • Allocate graduates to better organizations that really add new knowledge and allows room for implement SDG's in the community and practice to the graduates • Requesting for us professional in internships to that potential companies so that we can have chances of improving skills and get jobs in there.

7. Conclusions

HLIs are challenged to engender graduates that satisfy the current needs of the Construction Industry in addition to demonstrating an aptitude to even engage complex problems in an uncertain future. However, transitioning from being a student to a practicing professional is usually a dauting experience. Feedback over perceptions of student's level of preparedness is necessary to make this transition a more empowering experience. This study assessed the level of preparedness to start work, focussing on final-year students pursuing a Bachelor of Science degree in Quantity Surveying at the University of Rwanda, during the academic year 2019/20. Generally, students exhibited most knowledge in Core QSg competences, such as Estimating costs of Construction Works, followed by Mandatory and Optional Competencies. This suggested that the QSg program largely focused on Core competencies of QSg. Regarding key QSg module topics, students were most confident in the topic on Measurement of Finishes and of these, students with TVET background exhibited greater confidence, whereas female students were generally lesser confident. Most (42%) of the students indicated that they were "very prepared" to start working as QSs, with 12% "extremely prepared". An overwhelming majority concurred that Industrial Training attachment contributed to a large extent in preparing them to start work, whereas University Laboratory resources did not help that much. Improvement in teaching methods, emphasis on Industrial Training attachment, and implementing professional internships were the major suggestions the students posed to the University to improve their level of preparedness to start work. In general, students perceived that a greater focus on practical content has a positive impact on their perceptions of improving the level of preparedness to start work. Although this study focused on students that were yet to graduate from University, it provides a foundation for future similar research to be conducted on graduates that have had some immersion in the field of work, so as to corroborate the findings. Moreover, it is anticipated that the findings of this study will not only be applicable in Rwanda but also in other countries, especially in sub-Saharan Africa, offering similar programs.

References

Agllias, K. (2010). Student to Practitioner: A Study of Preparedness for Social Work Practice. *Australian Social Work, 63*(3), 345-360. doi: 10.1080/0312407X.2010.498522

AIQS (2012) *Competency standards for quantity surveyors, construction economists and cost engineers.* Sydney, Australia: The Australian Institute of Quantity Surveyors.

Bazeley, P. & K. Jackson (2013). *Qualitative data analysis with NVivo.* London, SAGE.

Cartlidge, D., (2011) New aspects of quantity surveying practice. 3rd ed. London and New York: Spon Press.

Commonwealth Sustainable Cities (2020). Planning for climate change and rapid urbanisation: commonwealth sustainable cities initiative. [online]. Available: https://commonwealthsustainablecities.org/onlineprogramme/

Department of Construction Management (2020), Archives, University of Rwanda.

DeVellis, R. F. (2017) *Scale Development Theory and Applications.* 4th Edition. Thousand Oaks, California: Sage.

Field, A. P. (2013). *Discovering statistics using IBM SPSS statistics: and sex and drugs and rock 'n' roll.* Los Angeles, CA: Sage.

García-Aracil, Adela, Monteiro, Sílvia, & Almeida, Leandro S. (2018) Students' perceptions of their preparedness for transition to work after graduation. *Active Learning in Higher Education, 0*(0), 1469787418791026. doi: 10.1177/1469787418791026

Güner, P. (2015). Preparedness of final-year Turkish nursing students for work as a professional nurse. J Clin Nurs, 24(5-6), 844-854. doi: 10.1111/jocn.12673

Kervin, J. B. (1992). *Methods for business research* New York, HarperCollins publishers.

Manakil, Jane, Rihani, Selwa, & George, Roy. (2015). Preparedness and Practice Management Skills of Graduating Dental Students Entering the Work Force. *Education Research International, 2015,* 976124. doi: 10.1155/2015/976124

Olweny, Mark R. O. (2017). Students 'motivation for architecture education in Uganda. *Frontiers of Architectural Research, 6*(3), 308-317. doi: https://doi.org/10.1016/j.foar.2017.06.002

Perera, S. (2006) Views of prospective graduate surveyors on their professional career plans: a survey of the final year undergraduates of the surveying courses conducted by the University of Ulster. RICS, Northern Ireland.

Perera, S., Pearson, J., Robson, S. & Ekundayo, D. (2011) 'Alignment of academic and industrial development needs for quantity surveyors: the views of industry and academia', in Proceedings of the RICS COBRA Research Conference, Manchester, UK, p676-686.

RICS (2011) Alignment of professional, academic and industrial development needs for quantity surveyors: the post recession dynamics. London, United Kingdom: Royal Institution of Chartered Surveyors.

Seeley, I. H. & Winfield, R., (2009) Seeley and Winfield's building quantities explained. Irish edn. New York: Palgrave Macmillan.

Towey, D., (2012) Construction quantity surveying a practical guide for the contractor's QS. West Sussex, United Kingdom: John Wiley & Sons Ltd.

Yogeshwaran, Gayathri, Perera, B. A. K. S., & Ariyachandra, M. R. Mahendrini Fernando. (2018). Competencies expected of graduate quantity surveyors working in developing countries. *Journal of Financial Management of Property and Construction, 23*(2), 202-220. doi: 10.1108/JFMPC-06-2017-0019

Williams, P., (2016) Managing measurement risk in building and civil engineering. West Sussex, United Kingdom: John Wiley & Sons Ltd.