An Assessment Of Higher Education Institution's Role In Developing Future-Ready Graduates (A Case Of The Built Environment Graduates)- A Systematic Review

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Abstract. The paper examines how institutions can prepare students for the careers of the future through experiential learning, industry partnerships, monitoring and feedback using a systematic literature review methodology that involves a review of articles from various databases. 120 articles were identified after screening only 24 peer-reviewed Journals were utilised for the study. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines checklist, an extensive search was conducted on Scopus, Google Scholar, and Elsevier (ScienceDirect) for articles published from 2013 to 2023. Search terms included "higher education," "future-ready," "graduates/students," "entrepreneurial," and "construction management." The search resulted in 120 articles being found and 15 were removed due to duplication and 58 were not relevant and we were left with 47 articles. A further search on 47 was conducted whereby 47 abstracts were screened we had to lay off 11 papers that were not specifically addressing the objective of the study. 36 articles were to be retrieved by the authors so that they could be fully analysed, only 26 articles were accessed and they were included in the study. The review of the literature provides a comprehensive understanding of the current state of the development of future-ready graduates. Moreover, experiential learning is a powerful tool in preparing students for the workforce. It provides opportunities for students to gain practical experience and apply their knowledge in real-world settings, giving them a competitive edge in the job market. Experiential learning involves learning by doing, which is an effective way to develop critical thinking, problem-solving, and decision-making skills. In addition, the need for effective career counselling services helps students identify their strengths and interests and align them with career opportunities Lastly, industry partnerships is very important since it provide students with access to industry-specific skills and experiences. Therefore, workforce development is a critical issue in higher education and institutions must take a comprehensive approach to prepare students for their careers. By doing so, institutions can ensure that students are equipped with the skills and knowledge necessary to succeed in an ever-changing job market.

Keywords: Institution; Learning; Students; Workforce

1. Introduction

Knowledge plays a crucial role in driving the economic development of a country. Hence, education is a vital element for a country to improve its economic growth [1]. Education is a fundamental and enabling human right. Therefore, education can be used as an instrument to achieve sustainable de-

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velopment goals including integrating sustainable development principles into the educational systems [1]. Education for sustainable development forms part of the United Nations (UN) 2030 sustainable goal 4 which aims to ensure inclusiveness and equitable quality education and promote lifelong learning opportunities for all [2]. Therefore, the role of education in achieving SDG 4 is very vital for higher institutions in terms of providing learners with the knowledge and skills needed to promote sustainable development [3]. Therefore, the paper seeks to explore various ways that higher institutions can play in the development of future ready. Since employers seek candidates who can quickly adapt to the workplace and deliver results without extensive training. Academic institutions have created various programs which are aimed at instructing students on concepts and skills. However, the true comprehension of learning only takes place when students put their knowledge into practice in real-life scenarios and giving them a competitive edge in the job market. In this context, the relevance of the study of the role of sustainable education in higher education in developing future-ready built environment graduates is relevant, since employers seek candidates who can quickly adapt to the workplace and deliver results without extensive training. In addition, the study is a systematic review of the literature (SRL). An SRL seeks to maximise the amount of information on how this topic has been published, on what research areas, on how the focus of such articles have been framed and what other criteria if any, have been developed by the scientific community on this topic. Taking this approach led to identifying that the few or no quantification systematic studies on this subject. Therefore, the relevance and the difference of this study concerning other systematic reviews are evident since this SRL brings together a variety and a considerable volume of information collected from various articles. Therefore, this study sets out to make contributions to organizations, governments, and the general population, about the role of higher education in preparing future-ready graduates. An analysis of the lit-

erature shows that a small number of studies have conducted an SRL on future-ready graduates the built environment students. Therefore, this article sets out to analyse the literature on the role of higher education in preparing future-ready graduates, to identify information, data evolution, characteristics and relevant hypothesis that has been discussed in scientific articles, thereby providing an investigation into what has been and is still being developed by the scientific community. The aim is to cover as much information as possible on the subject, thus helping organisations, governments, population, and guiding new research. Thus, this review contributes to a broader understating of sustainable education offering technological, and economic benefits through a variety of information and tools. Additionally, it provides strategies to improve the employability of graduates. Therefore, this review is quite significant within the global context, aiming to increase interest in research and applications in the area. This article is structured as follows: an introduction, which presents the scientific context, the relevance of the theme, the contribution of past studies and this paper's objectives. Section 2 presents the methodology used and the stage of SRL, and Section 3 presents the results which are discussed in Section 4, which also summarises the main contribution of this paper. Finally, section 5 briefly presents the main conclusion and makes some recommendations for future studies.

2. Methodology

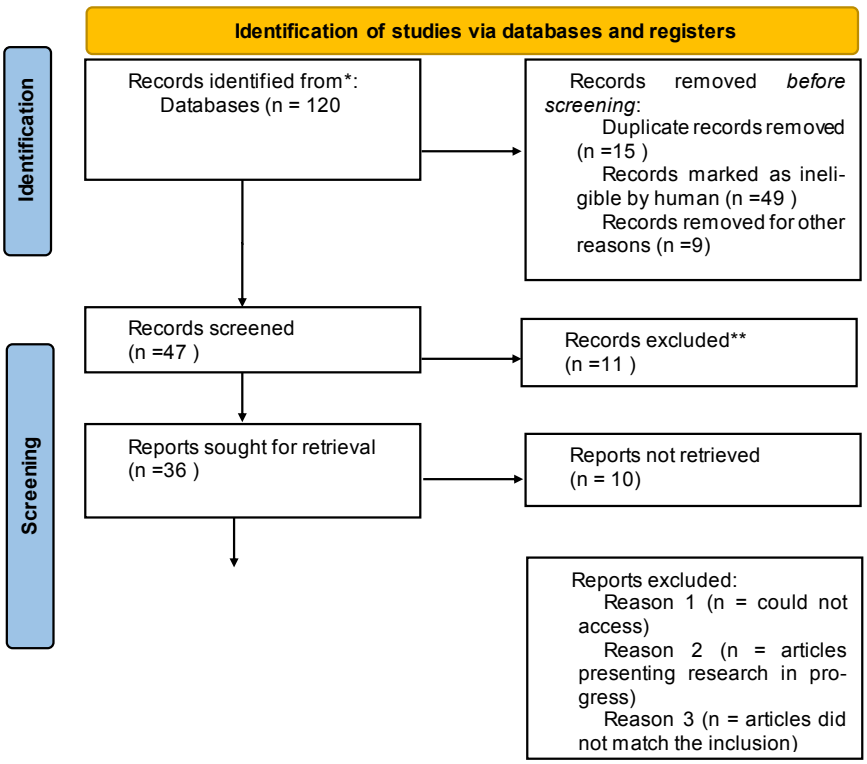
This section outlines the methodology that was employed in conducting a systematic review of sustainable education for future-ready built environment graduates. The systematic review was adopted to seek patterns across the built environment education and integrate different qualitative studies. The research approach was qualitative, aligned with the systematic review method and guideline of PRISMA. The objec-

tives were to identify, classify, and summarize research on sustainable education for improved employability strategies for built environment graduates. The search strategies resulted in 26 journals used for the analyses. The study referenced existing theoretical literature and utilized sources like conference papers, book chapters, and journals from platforms such as ScienceDirect, Scopus and Google Scholar. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines checklist by Page et al. in 2020, an extensive search was conducted on Scopus, Google Scholar, and Elsevier (ScienceDirect) for articles published from 2013 to 2023. Search terms included "higher education," "future-ready," "graduates/students," "entrepreneurial," and "construction management." The search resulted in 120 articles being found and 15 were removed due to duplication and 58 were not relevant and we were left with 47 articles. A further search on 47 was conducted whereby 47 abstracts were screened we had to lay off 11 papers that were not specifically addressing the objective of the study. 36 articles were to be retrieved by the authors so that they can be fully analysed, only 26 articles were accessed and they were included in the study and they are presented in Table 1 including citations of the journals.

Data collection encompassed article details, authors' affiliations, journal names, and publication years, organized in an Excel spreadsheet. 26 Articles were retrieved and underwent eligibility assessment by two reviewers, with disagreements resolved through consensus or a third reviewer. Incorporating pre-defined keywords and refining the checklist based on a preliminary trial, the study evaluated literature re-

lated to built environment students' and graduates' employability, future readiness, entrepreneurship, and higher education. Adaptations were made to suit the built environment domain, streamlining the checklist to 18 key points. One author led data extraction, cross-validated by another, and discrepancies were resolved through dialogue.

Inclusion and exclusion criteria were set based on the PRISMA recommendations. Non-research articles, works in progress, and those not meeting inclusion criteria were excluded. The search was restricted to peer-reviewed journal articles published in English. Google Scholar and Scopus were the main databases used to retrieve information. Only articles published from 2013 to 2023 were used to narrow and limit the articles. The specific inclusion and exclusion criteria can be found on Figure 1.



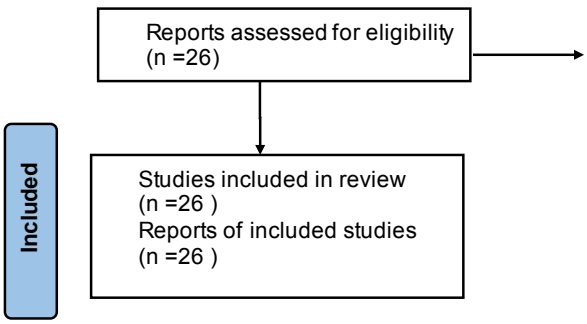


Figure 1: The PRISMA diagram

3. Findings

This section presents the findings from the review. Below, we discuss the answers to our research objective, which was to analyse the impactful role played by higher education in producing future-ready built environment graduates. A search was conducted on several databases for keywords as previously described. Figure 1 The PRISMA digraram represent the flow chart of the process of choosing articles, 120 articles were found and 15 were removed due to duplication and 58 were not relevant and we were left with 47 articles. A further search on 47 was conducted whereby 47 abstracts were screened we had to lay off 11 papers that were not specifically addressing the objective of the study. 36 articles were to be retrieved by the authors so that they can be fully analysed, only 24 articles were accessed and they were included in the study and they are presented in Table 1 including citations of the journals. The articles were analysed as to their general characteristics and so as to extract data on the impactful of higher education's role in producing future-ready built environment graduates in detail. In view of all criteria used to perform the SRL, the evolution of studies published

in the area in the period covered by this study could be identified. Figure 2 represents documents published per year from 2013 to 2023. It was also found that the number of published papers over time increased. There was a sharp increase between 2016 and 2018 at 15% as shown in Figure 2, it dropped drastically in 2019 to 3%; this might be caused by COVID-19 because we are seeing a steady rise of publications in 2020 with 12% and 2021 with 9% which reflects a growing interest in the field of future-ready graduates. Also after the effects of COVID-19 and technology higher education has to relook at what they are offering to produce relevant built environment graduates. For example, many papers highlighted that communication skills, teamwork, ability to solve problems, ability to self-management, ability to organise, ability to use technology and ability to learn lifelong are attributes of employability skills.

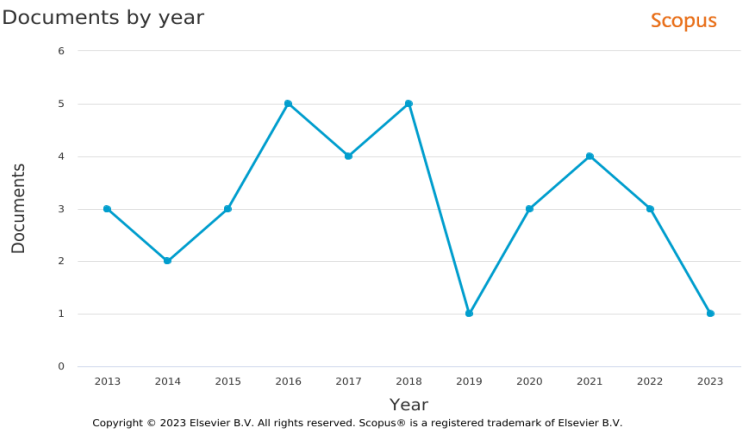


Figure 2: document by year

Figure 3 shows the leading countries where the studies were conducted where we saw the United States of America as the leading country with 37% of publications, United Kingdom had 11%, Brazil at 7%, Japan at

7%, Malaysia at 7%, New Zealand at 7%, Russia Federation at 7%, South Africa at 7%. Australia and Canada had 4% each.

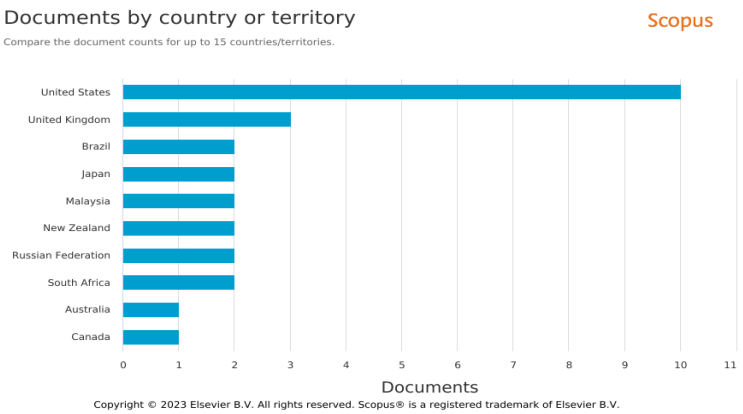


Figure 3: documents by country/territory

The main areas of the journals

The articles were spread over several journals such as the Congent Business and management journal (J26) cited 273, and the article published in 2015, Journal of Education and Training (J20 &J21) cited 193 and two articles were published in 2018 and 2012 respectively, Structural survey (J11) was cited 96 and the article was published in 2016, Career and Technical Education Research (J14), published in 2018, Higher education studies(J23) published 2015 and cited 76 times and lastly Engineering, Design and Technology (J1, J2, J3, J4, J6, J7) cited 68 times and the articles published 2023,2022,2021,2020 &2019; just to name the top six journals. Table 1 below reveals the journal used for the SRL, including the publication period and the year of publication of

the articles. This result shows the evolution and interest of the topic within the ten-year period.

Table 1: Journal citation 2013-2023

Item	Journals	Coding	year	citations	SE	WIL	JOBS/SKILLS	M&f
1	Journal of Engineering, Design and Technology	J1,J2,J3,J4,J6,J7,,Jj13	2023,2022,2021,2020,2019,2014	83	x	x	x	x
2	Journal of Engineering Technology	J5	2020	1	x	x	x	
3	International Journal of Building Pathology and Adaptation	J8	2018	16		x	x	
4	Civil Engineering and Environmental Systems	J9	2017	9	x		x	x
5	Journal of Integrated Design and Process Science,	J10	2017	8		x		x
6	Structural Survey	J11	2016	96	x		x	
7	ARPN Journal of Engineering and Applied Sciences	J12	2015	32			x	x
9	Career and Technical Education Research,	J14	2018	79	x	x	x	
10	Thinking Skills and Creativity	J15	2021	7		x	x	
11	International Journal of Technology and Design Education	J16	2023	4	x		x	x
12	Engineering, Construction and Architectural Management,	J17	2021	48	x	x	x	x
13	International Journal of Educational Management	J18	2020	20	x	x	x	
14	The International Journal of Management Education	J19	2018	44	x	x	x	x
15	Education+ Training	J20,J21	2018,2012	193	x	x	x	x
16	Journal of Marketing Education	J22	2021	42	x		x	
17	Higher Education Studies	J23	2015	76	x	x	x	x
18	International Journal of Construction Management	J24	2023	25	x	x	x	
19	Academy of Entrepreneurship Journal,	J25	2022	5	x	x		
20	Cogent Business & Management	J26	2015	273	x	x	x	x

4. Results

The study will present a systematic review of literature as per catergories below. The result will gradually be discussed in more depth by first introducing the quantitative findings and then framing these findings with qualitative results.

4.1 Sustainable Education

Based on literature review on future ready graduates, sustainable education for the built environment graduates, its clear that technology should be embraced and upskilling once self so as to be relevant in the industry, including soft skills is a must. In addition16 articles that were reviewed pointed out that education encompasses the knowledge and

skills necessary for individuals to function in contemporary society [4]. Moreover, the authors stated that the focus should lie in fostering introspective thinking and emotional capabilities, empowering young individuals to find their own path in life [4]. Furthermore, literature put an emphasis on the fact that education does not only equips students with technological tools and learning materials to enhance their academic performance [5] but is also seen as an ongoing effort to integrate students, educators, and technology effectively [6]. The significance of education cannot be understated, as it plays a pivotal role in transforming individuals, leading to improved productivity and work efficiency [7]. It serves as a vital tool in developing human resources, thereby contributing to the overall quality of the population and responsible management of environmental resources, ultimately fostering sustainable development [8]. Recognizing the role of sustainable education in shaping both individuals and societies, institutions of higher learning must adapt their curricula to support sustainable development, producing well-rounded, value-driven graduates who can make meaningful contributions to society. Sustainable development aims to create resilient societies that cater to the needs of present and future generations, wisely utilizing natural, financial, and cultural resources [5]. Achieving sustainable education development requires a change in the way we think and act, consequently, a transition to sustainable lifestyles, consumption and production patterns, only education and learning at all levels and in all social content can bring about this critical change [3]. According to [9], (2014), education transforms lives, through teaching and transferable skills necessary for global citizenship and changing

attitudes and behaviours needed to mitigate and reduce the lack of skills and improve the livelihood of people. So, it is vitally important for students to be prepared for the job market.

4.2 Jobs and skills for the future

A substantial volume of paper argues (n=20), that education, learning, and meaningful work serve as powerful drivers for economic success, individual well-being, and societal cohesion in our ever-evolving world. The ongoing global shift towards a future of work is marked by the advent of new technologies, interconnected economic systems, and rapid information dissemination [15]. Despite its promise, this shift has also raised concerns about widespread job displacement and skills shortages, especially due to advancements in artificial intelligence [16]. Figure 4 below reflect the volume of papers on specific skills. The authors have put an emphasis on different kinds of skills that a graduate should possess in order to be employable such as critical thinking, collaboration, communication, entrepreneurship skills, innovation, empathy integrated teamwork skills and should have a good attitude.

For the past five years, the World Economic Forum has been closely monitoring the labor market's transformation amid the Fourth Industrial Revolution. They have been actively exploring strategies to empower workers in transitioning from declining to emerging roles. However, the current economic recession has accelerated the pace of technological advancement, posing additional challenges [16]. Furthermore, critical thinking was identified by fourteen authors as a skill that fosters

idea generation and creative process development; collaborative and integrated teamwork skills were mentioned in 14 and 20 articles respectively, with an emphasis that collaboration is a vital tool that one should possess in order to strike partnerships. Additionally, virtual collaboration does not result in a deficiency in students' skill enhancement or effectiveness. This is a significant observation, especially given the recent context of the COVID-19 pandemic. Furthermore, built environment students has the advantage of benefiting more from the course as it offers inter disciplinary skill learning for an integration of two or more disciplinary and interdisciplinary skills needs to be made. Communication, good attitude and integrated teamwork were mention by 20 authors, this clearly shows that these types of skills are very important. Graduates from the built environment need communication skills to be able to express themselves and avoid errors, and conflicts on construction projects, especially in communicating concepts and ideas and rationalizing problem identification and solving. Entrepreneurial skills have been emphasised by the authors, graduates should be able to start their own businesses and sell their products and at the same time manage them well. Hence entrepreneurial skills and business thinking skills should be emphasized to be included in the curricula of the built environment so as to produce graduates who are future-ready. In addition, innovation was mentioned by 18 authors, the built environment student are encouraged to be creative and innovative since these skills are important in solving critical challenges that the built environment faces. Strategic decision-making and critical thinking are crucially needed and thinking on your toes is vital in the discipline of the built environment.

Hence higher institutions are encouraged to infused more modules that will foster a student to critically think and be innovative. The built environment professionals work against time and with new technology that creeps in and they need to adjust and embrace in order to keep up with the times and deliver projects on time with ease, hence empathy was also mentioned by 11 authors.

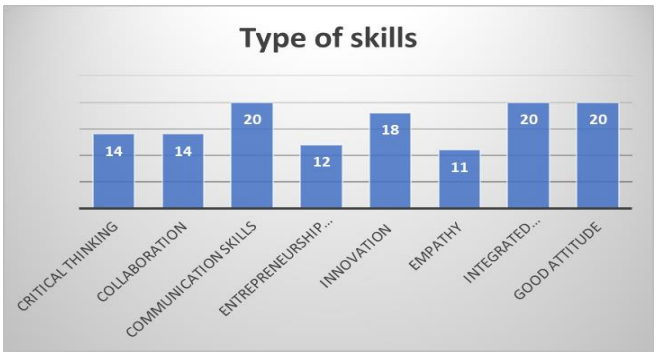


Figure 4:Type of Skills

4.3 Work Integrated Learning (WIL)

From the systematic literature review eleven authors stressed the importance of work integrated learning that it is highly effective educational approach that can be applied across various academic disciplines, including career development. It was first described by [17] (1984) and involves an active learning process where students acquire knowledge and skills through practical experiences, reflect on those experiences, gain insights from them, and then apply the learned concepts to make informed decisions and solve problems. Moreover, the eleven authors state that education, at its core, is about teaching and learning, and it

should enable individuals to apply the knowledge they gain in the classroom to real-world work scenarios [1] via the WIL. Furthermore, the authors concluded that work-integrated learning plays a crucial role in facilitating this transition, as it allows employers to assess potential students for employment [18]. By connecting theoretical knowledge to practical performance, students can bridge the gap between the classroom and the real world [19]. Numerous universities, particularly those focused on technology-related fields such as healthcare, engineering, teaching, and hospitality, have work-integrated learning into their curriculum, ensuring that students are better prepared for the workforce [20]. Unlike traditional educational approaches, work-integrated learning fully immerses learners in actual or simulated work environments, providing unique opportunities for individuals to acquire and apply job-specific skills through hands-on projects directly related to their chosen professions [21]. The integration of experiential learning into career development is rooted in Albert Bandura's concept of self-efficacy. Bandura argues that practicing and experiencing tasks first hand enhances an individual's confidence in their ability to succeed, leading to improved performance. This sense of self-efficacy, developed through experience, serves as the foundation for achieving success in task performance [22].

4.4 Mentoring and feedback

Twelve articles conclude that feedback is crucial for work-integrated learning to benefit both students and employers. It helps support students in preparing for the workforce and has been recognized as a valu-

able tool in higher education [23]. Industry experts stress the importance of regular feedback to keep work-integrated learning students engaged, allowing them to seek clarification and address any misunderstandings [24]. The "sandwich approach" to feedback suggests combining corrective feedback with praise or motivation for a well-rounded experience [24]. Researchers universally agree on feedback's pivotal role in enhancing student learning and performance [23]. Eleven authors state that not only is feedback vital in educational settings, but it also fosters growth and improvement in the workplace.

4.5 Industry partnership with higher institutions

Twenty four articles are all in agreement that in pursuit of excellence, universities are increasingly embracing collaborations with industries, since knowledge plays a crucial role in driving economic development [1]. Furthermore, universities are not only recognized as a centre for knowledge but also as an economic catalyst that significantly contributes to a country's growth. Hence the authors emphased that universities should strive to maintain a competitive edge by placing creativity and innovation at the forefront [19]. Likewise, industries are actively seeking partnerships and collaborations with academic institutions, driven by the need to innovate in response to growing competitive market pressures [19]. Therefore, universities and industry need to prioritize and foster an environment that promotes creativity and innovation. This entails creating spaces and programs that encourage collaboration, interdisciplinary research, and entrepreneurial thinking. By nurturing a culture of creativity and innovation, universities can attract talented

individuals, foster ground breaking research, and generate new ideas that have practical applications [19].

By establishing partnerships and collaborations, universities can bridge the gap between academia and the real world, ensuring that their research and knowledge translate into tangible benefits for society. This engagement can lead to the development of innovative solutions to societal challenges, the commercialization of research findings, and the creation of new business ventures [19]. In a rapidly evolving knowledge society, staying abreast of emerging trends, technologies, and societal needs is crucial. By offering relevant and flexible educational programs, universities can equip students with the skills and knowledge necessary to thrive in an ever-changing landscape [27,28]. Through the collaboration of U/I students gain practical experience and exposure to real-world challenges, enhancing their learning and preparing them for the workforce [29].

5. Discussion

From the systematic literature review conducted it is evident that in the ever changing world the built environment students should embrace several skills to be employable such as ability to critical think, solve problems on their toes, entrepreneurial and business skills, empathy, innovation should be acquired. Successful interns possess effective communication, self-motivation, and critical thinking skills. Furthermore, the authors concluded that experiential learning, university-industry partnerships, and feedback are driving forces behind work-

force development for the built environment students in the higher learning institution. Experiential learning helps students apply classroom knowledge in real-world settings, reinforcing acquired skills. These three elements have revolutionized the way individuals acquire knowledge, develop skills, and prepare for the dynamic job market. Students gain practical experience through real-world projects, working with cutting-edge technologies and industry mentors. Feedback loops enable rapid skill improvement and adaptability to emerging trends. University-industry partnerships facilitate access to state-of-the-art facilities and feedback from industry experts, ensuring graduates are well-prepared for the challenges in their various industries. Universities must prioritize creativity, innovation, engagement with stakeholders, infrastructure investment, and continuous learning to remain competitive in a knowledge society. Partnerships between universities and industry offer various benefits, including financial support and increased employment prospects for students. Purposeful leadership is vital to optimize human potential, foster prosperity, and address workforce challenges. Dynamic approaches like experiential learning and university-industry partnerships shape adaptable professionals, driving innovation and progress in future careers.

6. Limitation

This review might be considered limited as it only included articles from the education in the built environment, engineering. The research search strategy might lead to some limitation as well, although well considered, the authors included mostly papers found through a disci-

pline specific and only journals were the focus of the systematic literature review.

7. Future Work

The future research work could start by creating and better aligning education to industry-specific needs. Industry complains about lack of skills and graduates who are not industry ready. So work integrated learning is crucial for students to be relevant and bridge the gap that exist. Moreover higher institutions offering the built environment courses should adopt the work integrated learning to meet the industry needs, since we are seeing a decline in this activity since most universities are not offering diploma courses. Higher institutions should infuse entrepreneurial skills into the curriculum to promote critical thinking. Related to the learning objectives, universities are in need of a tool that can evaluate the current state of their design curricula based on these results and identify future learning objectives. Such a tool will ensure that these results can be translated into action plans and recommendations for built environment departments worldwide. the shift towards domain-specific knowledge and skills teaching should form a basis for future research to implement skill-developing-learning activities in current curricula.

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Appendix A

Table 1A: List of references used for SRL

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