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Essential Hard skill For Student in VUCA Era: Literature Study

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Abstract−The purpose of this article is to provide a literature study of essential hard skill for students in Volatility, Uncertainty, Complexity and Ambiguity (VUCA) era. The authors aim to base their new conceptualization on extensive evidence from literature review, and synthesis of the review of literature. An extensive literature review of essential hard skill for student in VUCA era is first carried out. Based on the review and synthesis of literature, an essential hard skill for student in VUCA era with three domain areas is conceptualized. The higher education curricula can now apply more specifically, any of the three dimensions areas of essential hard skill for student in VUCA era and understand the conditions under which a particular dimensions area is important for students to understand the changes caused by the VUCA and adjust the hard skills possessed by these changes.

Keywords: Hardskill; Volatile; Uncertainty; Complexity; Ambiguity; Literature Study

1. INTRODUCTION

Currently, the challenges faced by the younger generation are no longer the same as the problems faced by the previous generation. The younger generation now is facing more complex problems in various fields, both in academic and professional contexts (Delaney et al., 2017). World of education have to improve because of the transition faced by today's young generation is increasingly complicated by the widespread volatility, uncertainty, complexity, and ambiguity (VUCA) (Laco, 2021). Universities are required to be able to develop student competencies that can adapt to the work environment in VUCA situations. Students in this era must be able to develop adaptability skills and solve problems in world conditions that are not able to provide clear solutions.

21st-century learning requires students to become a workforce with a new paradigm that must be able to become independent thinkers, and decision-makers, and provide solutions to problems faced in the world of work. Students need to integrate knowledge and skills to contribute to their future work. The trend of learner-centered learning is becoming one of the most preferred options for growing competence through learning based on problem, learningvbased on project, and lecturers`s and student collaboration with society and industry (Qian & Clark, 2016; Ravenscroft et al., 2012).

Preparing students to be ready to face challenges in the 21st century which is full of uncertainty requires understanding the mastery of relevant skills in the future. Competency innovation is an important key so that students can remain relevant in the future world of work. Openness to accept change, the ability to increase the capacity and competence of both soft and hard skills, the ability to adapt, and getting used to the work environment in the real industry are important keys to preparing students who are ready to face the future. The world of education needs to narrow the gap between skills and industrial needs (Azzopardi & Dingli, 2021; Bughin et al., 2018; Romkey et al., 2021; Saatci & Ovaci, 2020). Interdisciplinary learning that integrates content knowledge and understanding in the world of Education with relevant skills in the job industry is an important solution. Preparing students with relevant skills in the future is a solution for universities so that students can adapt to the world of the workforce in VUCA situation.

2. RESEARCH METHODS

The method used in this article is a literature review. The literature study began by collecting relevant literature and research results on essential hard skill for students in Volatility, Uncertainty, Complexity and Ambiguity (VUCA) era.

3. RESULTS AND DISCUSSION

3.1 Result

3.1.1 Hard skills for Students

A hard skill is an ability that can be learned and improved through practice, repetition, and education. This hard skill can be obtained if someone is diligent and consistent in learning it. Learn a new skill, increase knowledge, realize your passion, and increase your readiness to change to the workplace (Behera & Gaur, 2021; Shtaltovna, 2021). Hard skills are skills that are no less important than soft skills. In the context of technical ability in the world of the workforce, hard skills are also needed. However, unfortunately, attention to hard skills is still flat. Research showed

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the workforce needs to master hard skills such as production, sales and marketing, digital technology and engineering , and computer skills (Lyu & Liu, 2021).

3.1.2 VUCA Concept

Conceptually, VUCA stands for volatile, uncertain, complex, and ambiguous. VUCA occurs due to changes in the business landscape that are increasingly uncertain due to the globalization of information technology developments, disrupted business models, shifting innovations, market disruptions, and so on. The existence of a socio-economic environment in a VUCA situation encourages people to learn to deal with various socio-economic scenarios in a VUCA situation (Ningthoujam, 2019).

3.1.3 Hard Skill And Vuca: Selected Works Of Literature

Searching using the keywords hard skills and VUCA 4,050 titles come out. After conducting further searches by reading the title, abstract, and further reading, 55 relevant papers were obtained discussing the theme according to the keywords used.

Table 1. Selected Literature for review

No.	Author	Title
1	(Flores et al., 2020)	A reference human-centric architecture model: A skill-based approach for education of future workforce
2	(Edmondson, 2021)	Embracing Ambiguity: A Workforce Training Plan for the Postpandemic Economy
3	(Salun et al., 2021)	Formation of Entrepreneurial Skills in Students in a Changing World
4	(Salun et al., 2020)	Students ' entrepreneurial skills formation in the changing world
5	(Smit, 2018)	Critical competencies of executive ICT leaders at Mobile Network Operators in South Africa
6	(Nair & Fahimirad, 2019)	A qualitative research study on the importance of life skills on undergraduate students' personal and social competencies
7	(Hanaky, 2021)	Leadership Development in Saudi Arabia's Private Sector: A Mixed Leadership Development in Saudi Arabia's Private Sector: A Mixed Methods Approach Methods Approach
8	(Shukla & Prasad, 2022)	COVID-19 Impact: Blended Learning in Sustainable Management Education - The New Normal
9	(Daud & Hanafi, 2022)	A Seat at the Table: Exploring 4.0 Leadership Attributes Using a Thematic Approach
10	(MARTÍNEZ CLARES & GONZÁLEZ LORENTE, 2018)	Career guidance, employability, and entering the workforce at University through a Structural Equation Model
11	(Savina et al., 2021)	Development of Universal Competencies in Teacher Education
12	(Ehlers, 2020)	Digital Leadership in Higher Education
13	(Golowko, 2021)	Future Skills in Education: Knowledge Management, AI and Sustainability as Key Factors in Competence-Oriented Education
14	(Laco, 2021)	Imagining youth futures
15	(Omara & Akwongo, 2022)	Learning To Teach in the Era of Uncertainties: Challenges and Lessons Learnt By Student Teachers During Covid-19 Pandemic in Uganda
16	(Witoon, n.d.)	Survive to thrive: How Finnish universities make use of futures knowledge in the 2021-2030 strategy
17	(Raob et al., 2021)	The Strategic Development for Research Excellence in Thailand 4.0 of Postgraduate students under Council of the Graduate Studies Administrations of Thailand (CGAT)
18	(Ivanova et al., 2021)	The wheel of science: A model for managing scientific activities in higher education as a factor in developing flexible skills of the youth in the region
19	(Krawczyńska-Zaucha, 2020)	What is the philosophy of education needed in the XXI century?
20	(Omara & Akwongo, 2022)	Learning To Teach in the Era of Uncertainties: Challenges and Lessons Learnt By Student Teachers During Covid-19 Pandemic in Uganda
21	(Seow et al., 2019)	Examining an experiential learning approach to prepare students for the volatile, uncertain, complex and ambiguous (VUCA) work environment
22	(Latha, 2020)	Vuca in engineering education: Enhancement of faculty competency for capacity building
23	(Hameed & Sharma, 2020)	A Study on Leadership Competencies of the Generation Z in a VUCA World

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No.	Author	Title
24	(Horstmeyer, 2020)	The generative role of curiosity in soft skills development for contemporary VUCA environments
25	(Waller et al., 2019)	Global higher education in a VUCA world: Concerns and projections
26	(Ningthoujam, 2019)	The VUCA Learner: Future-proof Your Relevance
27	(Shkarupeta et al., 2021)	Strategies for Developing Competencies for the VUCA World
28	(Daud & Hanafi, 2022)	A Seat at the Table: Exploring 4.0 Leadership Attributes Using a Thematic Approach
29	(Thery-Hart, 2021)	Navigating today's job market in Vuca times: French business graduates' perceptions of the job market and of an intrapreneurial-entrepreneurial approach to job search
30	(Horstmeyer, 2018)	How VUCA is changing the learning landscape–and how curiosity can help
31	(Savina et al., 2021)	Development of Universal Competencies in Teacher Education
32	(Raob et al., 2021)	The Strategic Development for Research Excellence in Thailand 4.0 of Postgraduate students under Council of the Graduate Studies Administrations of Thailand (CGAT)
33	(Seow et al., 2019)	Examining an experiential learning approach to prepare students for the volatile, uncertain, complex and ambiguous (VUCA) work environment
34	(Latha, 2020)	Vuca in engineering education: Enhancement of faculty competency for capacity building
35	(Hameed & Sharma, 2020)	A Study on Leadership Competencies of the Generation Z in a VUCA World
36	(Horstmeyer, 2020)	The generative role of curiosity in soft skills development for contemporary VUCA environments
37	(Nadiia Popova & Shynkarenko, 2016)	Personnel development at enterprises with regard to adaptation to the VUCA world
38	(Nangia & Mohsin, n.d.)	Sustainable Talent Management Practices In A Vuca (Volatile, Uncertain, Complex, Ambiguous) Environment
39	(Troise et al., 2022)	How can SMEs successfully navigate VUCA environment: The role of agility in the digital transformation era
40	(Adamczewski, 2020)	The Top ICT-Trends to Accelerate Digital Transformation in VUCA-Environment
41	(Eka et al., 2021)	How Did Small Business Against VUCA In Pandemic Era?
42	(Fernandes & Afonso, 2020)	A software engineering course that promotes entrepreneurship: Insights from a VUCA perspective
43	(Nowacka & Rzemieniak, 2021)	The Impact of the VUCA Environment on the Digital Competences of Managers in the Power Industry
44	(Nadezhda Popova et al., 2021)	Marketing aspects of innovative development of business organizations in the sphere of production, trade, transport, and logistics in VUCA conditions
45	(Laurin, 2018)	Organizing for Sales in VUCA Contexts: The Transformation Process from Products to Solution Sales
46	(Salun et al., 2020)	Students ' entrepreneurial skills formation in the changing world
47	(Salun et al., 2021)	Formation of Entrepreneurial Skills in Students in a Changing World
48	(Peschl et al., 2021)	Entrepreneurial thinking: A signature pedagogy for an uncertain 21st century
49	(Hanaky, 2021)	Leadership Development in Saudi Arabia's Private Sector: A Mixed Leadership Development in Saudi Arabia's Private Sector: A Mixed Methods Approach Methods Approach
50	(Ehlers, 2020)	Digital Leadership in Higher Education
51	(Handayani et al., 2020)	Exploring Skills Needed for Disruptive Digital Business
52	(Kennedy, 2020)	Tantangan Pendidikan Tinggi Menghadapi Perkembangan Teknologi Digital dalam Era VUCA
53	(Poernomo, 2020)	Peran Perguruan Tinggi Dalam Menyiapkan Pemimpin Masa Depan menghadapi Era VUCA
54	(Wikantiyoso et al., 2021)	A Construction of Entrepreneurial Personality Tests: Testing Archetype Personality Inventory in Entrepreneurship
55	(Nair & Fahimirad, 2019)	A qualitative research study on the importance of life skills on undergraduate students' personal and social competencies

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Results are the main part of scientific articles, containing: final results without data analysis process, hypothesis testing results. Results can be presented with tables or graphs, to clarify the results verbally.

3.2 Discussion

The changing of the current situation which is experiencing uncertainty due to globalization and the development of information technology has caused a massive disruption that affects all aspects of human life. The world of education is also experiencing the effects of changes that occur such as economic uncertainty, globalization, and new technologies (Omara & Akwongo, 2022). The education authority needs to develop an educational model that can adapt and modify knowledge and skills to be able to adapt to the changing world of workforce (Waller et al., 2019; Ningthoujam, 2019; Shkarupeta et al., 2021). The current education system is seen as uncorrelated with the needs of mankind in the 21st century, nor with the emerging new worldview. It is concluded that there is a need for an open philosophy for new challenges in today's educational realities (Krawczyńska-Zaucha, 2020). Education authorities need to prepare competent generations for the future (Golowko, 2021; Laco, 2021). In the VUCA era (volatility, uncertainty, complexity, and ambiguity), future knowledge can be useful for organizations to prepare and formulate the strategy of their to face the uncertain future (Witoon, n.d.; Ivanova et al., 2021).

The results of the literature search show that many studies show the importance of preparing human resources who can adapt and prepare themselves with relevant skills in the future. Chaotic markets require proper resource readiness. In chaotic market conditions, there are many independent, timely, compassionate, and relevant training programs available to enhance the skills needed in today's era of ambiguity (Edmondson, 2021). Included in VUCA, are the changing world conditions due to the COVID-19 pandemic. COVID-19 has changed the way education is managed. (Shukla & Prasad, 2022). Awareness of increasing student competence in the future world of the workforce is partly critical because most educational programs are not skill-based (hard skills). It only contains subject matter and basic technology. A new approach is needed to support and create education and training programs for university graduates to be ready to work in the industry (Flores et al., 2020). Students need to strengthen their competence by engaging in career guidance. This program can be a solution for connection between higher education and work at times of change and transition to the world of the workforce (MARTÍNEZ CLARES & GONZÁLEZ LORENTE, 2018).

3.2.1 VUCA and Hard Skills in General

Several kinds of literature indicate the need to develop hard skills as a strategy to adapt to changing situations due to the VUCA situation. Human resources and productivity are very important to move forward and remain competitive in the competitive environment of the industrial 4.0 era and the VUCA situation. Some skills are needed, including inspirational motivation, innovation, vision, passion, thinking in strategic, focus, collaboration, flexibility, communication, accountability, tech-savvy, entrepreneurial, and agile (Daud & Hanafi, 2022; Thery-Hart, 2021). It must be acknowledged that VUCA has changed the global education landscape. Curiosity is an attitude that needs to be continuously developed so that students stay up to date with VUCA conditions (Horstmeyer, 2018; Savina et al., 2021; Raob et al., 2021).

Several strategies are offered to improve students' hard skills in general, among others, Popova & Shynkarenko, (2016), Seow et al., (2019), Latha, (2020), Hameed & Sharma, (2020), Horstmeyer, (2020), and Nangia & Mohsin, (n.d.) reinforce the importance of experiential learning for students. The VUCA situation encourages students to increase their capacity by being armed with a never-ending curiosity, and integration between knowledge and work skills.

3.2.2 VUCA and Hard Skills in Specific

Many studies reinforce the importance of hard skills for students to be able to deal with changing work situations due to the VUCA situation. Some studies such as Fernandes & Afonso, (2020), Adamczewski, (2020), Eka et al., (2021), Nowacka & Rzemieniak, (2021) reinforce the importance of ICT hard skills for students to be able to adapt to the world of work in the future. Technological developments require students to improve their hard skills in mastering ICT so as not to be left behind with the trend of using relevant technology in the industry.

Popova et al., (2021) the need for Marketing Hard Skills for students to adapt in the future work industry that was caused by the VUCA situation. The market has changed. Likewise, marketing strategies and media have also changed. Students as future workers need to be prepared to face market changes by being equipped with marketing skills that are relevant to the VUCA situation. Laurin, (2018) also reinforces the need for future workers to understand and master sales techniques that are relevant to the VUCA situation. The orientation of selling products must shift to the orientation of providing solutions so that sales as hard skills remain relevant.

Salun et al., (2021), and Peschl et al., (2021) emphasize the importance of entrepreneurial hard skills in dealing with VUCA conditions. This entrepreneurial ability equips students to be able to independently open a business during the uncertainty in the VUCA era. Entrepreneurship skills are critical because the job industry requires people who can think critically, and independently, and provide solutions to every problem they face. Entrepreneurial competence reflects all these abilities to be able to adapt to the work industry. The hard skill that is also found in the literature study is the Leadership Hard Skill (Ehlers, 2020); (Hanaky, 2021). Universities need to prepare students who have

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qualified abilities as future leaders. There needs to be a lot of skills (hard skills and soft skills) taught in the program that can be incorporated into school curricula to ensure and increase the skill and competency for future workers are better prepared.

4. CONCLUSION

The VUCA era creates disruption in human life. College students are no exception, who must adjust their hard skills to the demands and needs of hard skills needed in the current VUCA era. The hard skills possessed by students will be useful as provisions for success in the world of work later. This study conducted an in-depth literature review of the hard skills needed in the VUCA era. And produce three domains consisting of marketing hard skills, entrepreneurial hard skills and leadership hard skills.

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