

## 21st-Century Literacy Skills Among Open and Distance Learners

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### Article Info:

Received: 26 Jul 2022; Revised: 15 Jan 2023; Accepted: 15 Feb 2023; Available Online: 20 Feb 2023

### Abstract

*Due to ever-changing business environments in the 21<sup>st</sup> century, today's employers are demanding a workforce with a different set of skills. Employers have raised concerns about the need for a future workforce with higher skills and literacy levels due to volatile, ambiguous, and dynamic changes in the workplace. Due to rapid technological advancements that have transformed business models, the workforce needs to be able to handle tough situations, and equip themselves with well-rounded skills from various areas. Digitalisation is one of the main changes that influence shifts in market operations, turning physical brick-and-mortar businesses into online and virtual businesses. Skills that are needed in the ever-changing market must be implemented, emphasised, and introduced in the education system. In connection with this, this study thus focuses on 21<sup>st</sup>-century literacy skills in open and distance learning (ODL). ODL is a flexible learning approach that is conducted online, mainly catering to working adults. This study examines the learning outcomes of a course based on affective, behavioural, and cognitive domains. This study hopes to provide insights into improvising the higher education syllabus in order to meet the aims of Malaysia's 21<sup>st</sup>-Century Learning (Pembelajaran Abad ke-21).*

**Keywords:** *21st-century skills, affective domain, behavioural domain, cognitive domain, literacy, open and distance learning*

### 1. Introduction

In-demand skills have changed over the years, and there is a set of skills that have become requisite specifically in the 21st century. As a response to this, education institutions and providers need to regularly review academic curriculum design in order to inculcate the required skills through their courses and programmes. This is due to fierce corporate competition in the workplace, where employers tend to have higher requirements and expectations from graduates. 21st-century skills are needed to ensure graduates' employability, and also provide them with better career prospects. Achieving what is intended in this context is certainly a challenging and complicated process, as there are new soft skills that are especially necessary in the 21st century, such as critical thinking, problem-solving, agility and adaptability, creativity and imagination, as well as mastery of oral and written communication.

An introductory course on 21<sup>st</sup>-century skills has been introduced at Open University Malaysia (OUM) and offered to all first-semester learners. This course is *Learning Skills for the 21st Century* (course code

OUMH1603). This course comprises 10 introductory topics addressing various crucial skills that hope to provide new learners with a basic idea of their forthcoming courses that are expected to enhance these skills throughout their study duration at OUM. The latest version of this course was introduced in the May 2019 semester. Hence, this module is relatively new, and this study examined the learners' attitudes, beliefs, and behaviours once they have completed this course in their first semester.

A total of 368 respondents who were registered for the OUMH1603 course in the May 2021 semester were involved in this study. Their cognitive, affective, and behavioural domains based on the contents in the OUMH1603 course were examined.

## 2. Literature Review

Over the years, educational trends have shifted to accommodate the digitalisation process. Digital technology has shifted from luxury to necessity; it is today a must-have service for many. Due to the rise of digitalisation and the importance of technology, developing relevant 21<sup>st</sup>-century skills is important in order to meet new workforce and market demands (García-Pérez et al., 2021). In addition to developing a new set of skills, reducing structural unemployment in a country in which the workforce lacks necessary 21<sup>st</sup>-century skills is also equally crucial. According to Yusup (2014), learning theories have been transformed from behaviourism, constructivism, and cognitivism to now connectivism, in which online learning platforms, interactive learning materials, and social media are what is required for learners to learn in the 21<sup>st</sup> century. Connectivism permits learners to develop essential skills that underlie 21<sup>st</sup>-century teaching and learning, namely critical thinking, collaboration, communication, creativity and innovation, self-direction, making global and local connections, and using technology as a learning tool (Niu et al., 2021).

There are different sets of required skills that have been identified in various studies: communication skills, ability to study independently, ethics and responsibility, teamwork and flexibility, thinking skills, digital skills, and knowledge management (Bates, 2016); as well as creativity, critical thinking, problem-solving, decision-making and learning, ways of working (communication and collaboration), tools for working (information and communication technology, and information literacy), and skills for living in the world (citizenship, life and career, and personal and social responsibility) (Yusup, 2014).

The Malaysian Ministry of Education has emphasised 21<sup>st</sup>-century learning (*Pembelajaran Abad ke-21*, or PAK21) in the local education system, which is a process highlighting the relevant knowledge, competencies, and characteristics that learners should possess in order to be competitively relevant and empowered to face the challenges of 21<sup>st</sup>-century volatility. The five aspects of communication, collaboration, critical thinking, creativity, and values and ethics, or 4C1V, guide PAK21's student-centred learning method (Habhajan Singh, n.d.).

In the 21<sup>st</sup> century, graduates need to possess good academic qualities balanced with good moral values and intrinsic and extrinsic ethical virtues. This is necessary to prepare them for complex and vast challenges in the 21<sup>st</sup>-century working environment. As members of the future workforce, graduates need to have all the required skills and values to face future challenges and contribute to the growth of the country. This is where higher education institutions play a vital role, as universities are where learners learn, train, and absorb skills needed in the dynamic 21<sup>st</sup> century.

OUM began offering the OUMH1603 course to introduce learners to basic skills required in the 21<sup>st</sup> century. Learners are encouraged to use the knowledge and skills learnt in this course in various life situations, whether they are personal or work-related, to weather the storm in stiff competition in today's working and business world. Understanding the impact that OUMH1603 has had is crucial; it is important to assess the learners' affective, behavioural, and cognitive responses to the 21<sup>st</sup>-century skills that can be gained from this course. Learners' attitudes can be influenced by the characteristics of their thoughts (cognitive), feelings (affective), and behaviours (conative) (Sinaga and Pustika, 2021).

OUMH1603 was introduced to teach and enhance learners' skills that are needed in the 21st century. This research aims to study the impact of the OUMH1603 course on learners' affective, behavioural, and cognitive domains.

The research objectives of this study are:

- To assess if changes in the affective domain are significant after completing the course;
- To examine if changes in the behavioural domain are significant after completing the course; and
- To evaluate if changes in the cognitive domain are significant after completing the course.

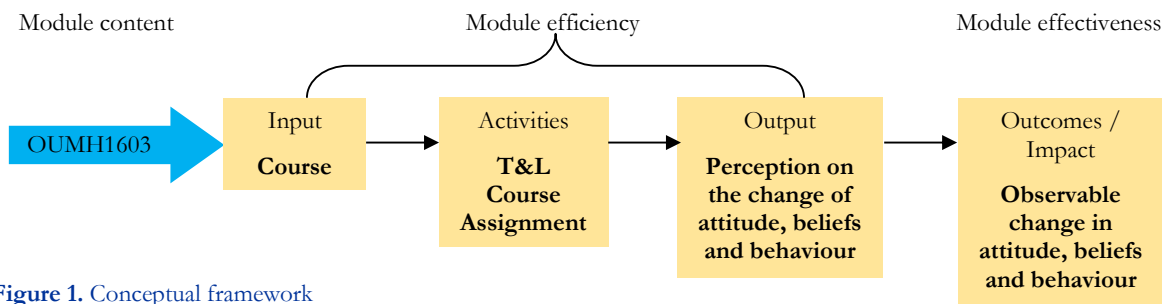
The research questions of this study are:

- Are changes in the affective domain significant after completing the course?
- Are changes in the behavioural domain significant after completing the course?
- Are changes in the cognitive domain significant after completing the course?

The research hypotheses in this study are:

- H1: Changes in the affective domain are significant after completing the course;
- H2: Changes in the behavioural domain are significant after completing the course; and
- H3: Changes in the cognitive domain are significant after completing the course.

This study explores learners' perceptions of the impact of the OUMH1603 module within the three domains (attitude, beliefs, and behaviours) in relation to the required skills of the 21<sup>st</sup> century. Figure 1 shows the conceptual framework of this study.



**Figure 1.** Conceptual framework

Figure 1 illustrates the conceptual framework used in this study. This study uses the Theory of Change (ToC), which explains the process of change by drawing causal connections in an initiative, i.e., its shorter-, intermediate-, and longer-term outcomes (Clark & Taplin, 2012). This theory highlights the logical relationship of all chosen variables and the outcomes. The output are the outcomes that will move from the short- to intermediate- and lastly, to the long-term. In this study, this pertains to the impact of the OUMH1603 course on various 21<sup>st</sup>-century skills on the affective, behavioural, and cognitive domains.

An essential development in the push for educational reform in undergraduate science, technology, engineering, and mathematics (STEM) fields has been a heightened emphasis on examining the system and culture in which teaching and learning take place. This approach, as demonstrated by Henderson et al. (2011), recognises the significance of change theory and research in deepening our comprehension of the circumstances surrounding a reform initiative. This includes considering the relevant communities, individuals, and stakeholders involved, as well as the prevailing policies, practices, and beliefs. Moreover, it involves assessing the capacity and openness of those affected by the reform, and considering historical, political, and sociocultural factors that shape the educational landscape. Nevertheless, studies investigating the factors influencing faculty adoption of evidence-based teaching strategies reveal that they predominantly rely on personal experiences rather than empirical evidence (Andrews & Lemons, 2015; Dancy et al., 2016).

### 3. Research Method

This study uses a survey questionnaire that was designed using Google Form and distributed through myINSPIRE, which is the learning platform used at OUM. With the assistance of OUM's Centre of Learner Affairs, the survey was sent to all learners taking OUMH1603 in the May 2021 semester. The responses collected were then quantitatively analysed. Quantitative analysis was selected because a five-point Likert scale was used for the questionnaire items. The questionnaire items consist of demographic details of respondents, and the related items on affective, behavioural, and cognitive domains. In ascending order, the topics covered in OUMH1603 are as follows: Overall 21st Century Skills, Study Skills, Numeracy Skills, Digital Numeracy, Creativity and Innovation, Critical Thinking and Reasoning Skills, Communication Skills, Collaborative Skills, Career and Life Skills, and Environment Literacy.

This OUMH1603 subject was chosen from a pool of available subjects due to the following reasons:

- i. It is a first-semester subject for all new learners pursuing undergraduate programmes at OUM.
- ii. It is compulsory, and comes with no exemption or credit transfer option.
- iii. A high number of learners register for this course every semester, with a total of 2,380 registered for the May 2021 semester.
- iv. A high number of tutors are appointed to facilitate this course, with a total of 19 facilitators involved in the May 2021 semester.

Details of the questionnaire developed for this study are as follows:

- i. A total of 40 questions developed covers the intended domains: cognitive (C), affective (A), and behavioural (B) domains.
- ii. Four questions were prepared for each topic, with three for each of the A, B, and C domains, and one additional question for the overall presence of these three domains in the topic.
- iii. The questionnaire was prepared in two languages: Malay language (*Bahasa Malaysia*) and English language. This bilingual approach is meant to aid the respondents' understanding of the questionnaire items.

The following are sample questions in the cognitive domain:

- i. I know how to write a proper academic paper.  
*Saya tahu bagaimana menulis penulisan akademik yang betul.*
- ii. I do use numeracy skills in problem-solving and decision-making.  
*Saya menggunakan kemahiran celik angka dalam penyelesaian masalah dan membuat keputusan.*
- iii. I will find a creative and different way to solve problems.  
*Saya akan mencari penyelesaian yang kreatif dan inovatif untuk menyelesaikan masalah.*

The following are sample questions in the affective domain:

- i. I believe I can handle any problems using the Internet.  
*Saya percaya saya boleh menangani sebarang masalah dengan menggunakan Internet.*
- ii. I listen to the opinion of other members with utmost respect.  
*Saya mendengar pendapat ahli lain dengan penuh hormat.*
- iii. I feel that I have a responsibility towards the world's inequities and problems.  
*Saya merasakan bahawa saya mempunyai tanggungjawab terhadap ketidak-samaan dan masalah dunia.*

The following are sample questions in the behavioural domain:

- i. I recycle, reuse, and reduce materials every day.  
*Saya mengitar semula, menggunakan semula, dan mengurangkan penggunaan bahan setiap hari.*
- ii. I communicate in an effective manner to ensure mutual understanding.  
*Saya berkomunikasi secara berkesan untuk memastikan persefahaman bersama.*
- iii. I can solve problems using simple numerical skills.  
*Saya boleh menyelesaikan masalah dengan menggunakan kemahiran berangka.*

The survey was distributed electronically via Google Form as the number of learners registered for this course is high with approximately 2,380 enrolled in the May 2021 semester. A five-point Likert scale for 40 questions was used to measure the variables in this study using the following scale:

1: Strongly disagree, 2: Disagree, 3: Neutral, 4: Agree, and 5: Strongly agree.

Data was collected from late August 2021 to mid-September 2021 with 368 of the 2,380 potential respondents who filled in the questionnaire by the stipulated timeline. This data collection timeframe was determined following deadlines for continuous assessment (e.g., assignment submission) during that semester. Because this course does not include a final examination, it is reasonable to infer that at this point, learners had learnt the contents of the course and have had the opportunity to practise the relevant skills in their daily life.

#### 4. Findings and Discussion

The demographic details of the 368 respondents are illustrated in Table 1. The majority of respondents were females aged between 26-35 years who were working in the private sector, and at the time pursuing bachelor's degree programmes at OUM.

**Table 1.** Respondents' Demography

		Frequency	Percent
<b>Gender</b>	Female	253	68.8
	Male	115	31.3
<b>Age category</b>	25 years and below	138	37.5
	26-35 years	146	39.7
	36-45 years 46-55 years	66 18	17.9 4.9
<b>Type of employment sector</b>	Public	100	27.2
	Private	188	51.1
	NGOs Others	7 73	1.9 19.8
<b>Current level of studies pursued</b>	Diploma Bachelor's degree	89 271	24.2 73.6
	Others	8	2.2
	Total	368	100.0

Table 1 shows that there was a higher number of female respondents compared to male respondents, at 68.8% and 31.3%, respectively. In addition, 37.5% were respondents aged 25 years or younger, 39.7% between 26-35 years, followed by 17.9% between 36-45 years. Approximately 51.1% and 27.2% were working in the private and public sectors, respectively. Moreover, approximately 73.6% and 24.2% were enrolled in Bachelor's degree and diploma programmes at OUM, respectively.

**Table 2** Multiple Regression for 21<sup>st</sup>-Century Learners' Skills in the Affective Domain

	B	R Square	Adjusted R Square
(Constant)	0.04	0.96	0.96
Creative and innovative	0.11*		
Collaborative	0.09*		
Numerical	0.10*		
Study	0.12*		
Career and life skills	0.10*		
Critical thinking	0.13*		
Digital	0.12*		
Overall	0.09*		
Environmental	0.07*		
Communication	0.05*		

\*Significant at 1%

Table 2 illustrates that the coefficient value for the affective domain is 0.04. The highest coefficient value in this domain is for critical thinking, followed by study skills, and digital skills. This can be explained by the fact that these skills are measured affectively, i.e., involving feelings, emotions, and an acceptance or rejection of certain tones, etc. A 0.96 R<sup>2</sup> value for this domain is relatively high as it is a statistical measurement of how close the data obtained are fitted to the regression line. This is also known as the coefficient of determination, or the coefficient of multiple determination for multiple regression. The 0.96 R<sup>2</sup> value means that the skills/variables are approximately 96% represented in this study, and the changes in each of the significant factors will have an effect on the domain with a 96% statistical approximation. The prediction model for the affective domain is as follows:

$$\text{Affective} = 0.04 + 0.11 \text{ Creative and innovative} + 0.09 \text{ Collaborative} + 0.10 \text{ Numerical} + 0.12 \text{ Study} + 0.10 \text{ Career and life skills} + 0.13 \text{ Critical thinking} + 0.12 \text{ Digital} + 0.090 \text{ Overall} + 0.07 \text{ Environmental} + 0.05 \text{ Communication}$$

**Table 3** Multiple Regression for the 21<sup>st</sup>-Century Learners' Skills in the Behavioural Domain

	B	R Square	Adjusted R Square
(Constant)	-0.15	0.94	0.94
Creative and innovative	0.11*		
Collaborative	0.17*		
Critical thinking	0.16*		
Study	0.13*		
Career and life skills	0.13*		
Numerical	0.08*		
Environmental	0.11*		
Overall	0.08*		
Digital	0.06*		

\*Significant at 1%

Table 3 illustrates that the coefficient value for the behavioural domain is -0.15. The highest coefficient value in the behavioural domain is for collaborative skills, followed by critical skills, study skills, and career and life skills. This is because these specific skills can be measured with physical movements, as they are skills that require physical action. The 0.94 R<sup>2</sup> value for this domain is relatively high as well, signifying that the skills/variables are approximately 94% represented in this study, and the changes in each of the significant factors will have an effect on the domain with a 94% statistical approximation. The prediction model for the behavioural domain is as follows:

$$\text{Behavioural} = -0.15 + 0.11 \text{ Creative and innovative} + 0.17 \text{ Collaborative} + 0.08 \text{ Numerical} + 0.13 \text{ Study} + 0.13 \text{ Career and life skills} + 0.16 \text{ Critical thinking} + 0.12 \text{ Digital} + 0.08 \text{ Overall} + 0.11 \text{ Environmental} + 0.006 \text{ Digital}$$

**Table 4.** Multiple Regression for the 21<sup>st</sup>-Century Learners' Skills in the Cognitive Domain

	B	R Square	Adjusted R Square
(Constant)	0.09	0.96	0.96
Creative and innovative	0.10*		
Numerical	0.15*		
Communication	0.12*		
Overall	0.13*		
Critical thinking	0.12*		
Study	0.10*		
Career and life skills	0.08*		

	B	R Square	Adjusted R Square
Environmental	0.09*		
Collaborative	0.05*		
Digital	0.03*		

\*Significant at 1%

Table 4 illustrates that the coefficient value for the cognitive domain is 0.09. The highest coefficient value in the cognitive domain is for numeracy skills, followed by communication, and critical thinking skills. The 0.96 R<sup>2</sup> value is relatively high, signifying that the skills/variables are approximately 96% represented in this study, and the changes in each of the significant factors will have an effect on the domain with a 96% statistical approximation. The prediction model for the cognitive domain is as follows:

Cognitive = 0.09 + 0.10 Creative and innovative + 0.05 Collaborative + 0.15 Numerical + 0.12 Communication + 0.10 Study + 0.08 Career and life skills + 0.12 Critical thinking + 0.03 Digital + 0.13 Overall + 0.09 Environmental

**Table 5.** Multiple Regression for All Three Domains

	B	R Square	Adjusted R Square
(Constant)	0.00	0.99	0.99
Creative and innovative	0.11*		
Collaborative	0.11*		
Numerical	0.11*		
Career and life skills	0.10*		
Study	0.12*		
Critical thinking	0.14*		
Overall	0.10*		
Environmental	0.10*		
Digital	0.07*		
Communication	0.04*		

\*Significant at 1%

Table 5 illustrates the coefficient value for multiple regression for all three domains is 0.00. The highest coefficient value is for critical thinking skills. This corresponds with critical skills as having one of the highest coefficient values for all three domains as shown in Tables 2, 3, and 4. A 0.99 R<sup>2</sup> value for all three domains is also relatively high, which corresponds to high R<sup>2</sup> values in all three domains independently. This R<sup>2</sup> value signifies that the skills/variables are approximately 99% represented in this study, and the changes in each of the significant factors will have an effect on the domains with a 99% statistical approximation. The prediction model for all three domains is as follows:

All three domains = 0.00 + 0.11 Creative and innovative + 0.11 Collaborative + 0.11 Numerical + 0.04 Communication + 0.12 Study + 0.10 Career and life skills + 0.14 Critical thinking + 0.07 Digital + 0.10 Overall + 0.10 Environmental

This study can be expanded by exploring the effectiveness of this course over several semesters. In addition, the total number of respondents could be increased in order to represent a larger portion of the learner population. Future studies could also include looking in greater detail at each skill and its coverage and content within the course.

Generally, critical thinking, study, and digital skills had the highest coefficient values in the affective domain. This is due to the fact that affective is a domain that measures the skills and moral values that learners generally develop after taking the course. Meanwhile, collaborative, critical, study, and career and life skills had high coefficient values in the behavioural domain. This is because a majority of the respondents were working adults who were used to using their work and life experiences to solve

problems. These skills are also measured with physical movements, i.e., they require physical action. Lastly, numeracy skills had the highest coefficient value in the cognitive domain, followed by communication, and critical thinking skills. This can be explained by the fact that this course involves interactive activities and assessments.

## 5. Conclusion

The Malaysian Qualifications Agency has provided new guidelines to inculcate 21<sup>st</sup>-century skills in the current Malaysia workforce. As one of the leading private ODL institution in Malaysia, OUM has pledged to provide educational opportunities by leveraging technology, and producing high-quality graduates who can meet current workforce demands. The Learning Skills for the 21<sup>st</sup> Century (OUMH1603) course aims to introduce adult learners to crucial 21<sup>st</sup>-century skills. There are topics dedicated to certain skills, such as ethics and professionalism, entrepreneurship, business communication, etc. The results of this study shows that the majority of the learners have had a significant positive change after taking the course, as most of the skills/variables yielded significant values for the skills attained after they completed the course. All the topics have a significant impact on all the three affective, behavioural, and cognitive domains. However, there is a need to focus on building creative and innovative skills as well as environmental skills, as these two skills show a relatively low coefficient value despite being positively significant within all three domains. Based on the results, the academic assessment and learning activities can be designed with these skills in mind, and towards improving the skills learnt by the learners through the course.

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**Funding:** The author would like to acknowledge the financial support received from Grant OUM-IRF-2021-00.

**Acknowledgment:** The author would like to acknowledge the contributions of the journal advisors, chairpersons, editorial board members and the respective international offices for their continuous support. Limited to grant providers and/or selected individuals whose work made a significant contribution to the article presented.

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