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Original Article

Future Skills of Tertiary Students Required for Industry in the Eastern Special Development Zone of Thailand

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Abstract

Future skills are critical for tertiary students who want to compete in the industrial world. On the other hand, some conventional educational institutions typically lack instruction in these skills. The purposes of this research were to develop a model of future skills and test its consistency with empirical data, and to establish guidelines for the development of the skills. An explanatory sequential mixed methods study was conducted in two phases. Quantitative data were collected from 1,135 students from 227 disciplines, using multistage random sampling and multilevel confirmatory factor analysis. Qualitative data were collected from ten key informants through in-depth interview content analysis. The results from the quantitative phase revealed that the skill-measurement model consisted of three factors and 11 components and consistent with the empirical data ($\chi^2 = 73.62$, $df = 56$, $\chi^2/df = 1.31$, $p = .06$, RMSEA = .02, CFI = 1.00, TLI = 1.00, $SRMR_W = .01$, $SRMR_B = .07$). The qualitative phase supported the quantitative finding, and indicated that life and career skills were the most important skills in the future skills of tertiary students. For the components of life and career skills, flexibility and adaptability skills were the most important at student level, while productivity and accountability skills were the most important at discipline level. Therefore, the guidelines for developing the future skills of tertiary students should first focus on learning from actual working to adapt to the future working environment and the curriculum should ensure the need from the private sector and student's accountability.

There were nearly 80,000 unemployed new graduates in higher education in 2019 and 2020 in Thailand (Thansettakij Digital, 2022). This number gradually increased to 120,000 people, but according to the online job announcement, there were around 500,000 positions needed. Despite numerous job advertisements, new graduates were still unable to find employment because employers required not only specific skills but also English, digital, and critical thinking skills (Songsakul, 2022). New graduates still have a skill gap, making it more difficult to find work. Thai society values the disciplines of social sciences and liberal arts. Most people want their children to study in these fields, however, the labor market does not require much work force in these field, resulting in increased unemployment as they did not possess the needed skills of the labor market (Paprika & Nagy, 2012; Thansettakij Digital, 2022). As a result, in order to enter the labor market, students must have the skills that are in demand, especially soft skills such as communication, teamwork, creativity, and adaptability (Rudowicz et al., 2009; Songsakul, 2022). Hard skills and soft skills are important for learning social interactions and career progress (Majid et al., 2012). In the industrial world, soft skills are important for the achievement of the company's objective in securing the cooperation and participation of its employees. Ramlan and Ngah (2015) stated that the students realized the importance of soft skills in learning and

working environment. However, students continued to struggle with communication, teamwork, and fundamental working skills (Munintarawong, 2018).

Twenty-first century skills or the future skills are critical in producing graduates who can meet labor market demand (Partnership for 21st Century Skills, 2008; 2011). Integrity, team collaboration, creativity in result-oriented world are needed in EEC industry (EEC, 2019a). The 21st century skills are crucial for improved learning quality. However, the learning and innovation skills will help enhance the students in learning techniques and analytical skills so that they are more able in solving the problems in the work assigned to them with better efficiency, or in creating innovation. Furthermore, the information and technology skills will support the learning and innovation skills of the students. When the students are equipped with the information, communication and technology skills (ICT), they will be able to receive information from around the world. This implies that the ICT render the world open to the students, and the students to the world, causing the world to be smaller and easier to learn from. Being able to access all the needed information is not all that is needed. The students also need analytical skills so that they can analyze the information. Information and media learning skills are also important for the students' ability in comparison and synthesis of information which will help them in determining what is right or wrong (Partnership for 21st Century Skills, 2008, 2011; Trilling & Fadel, 2009).

Thailand's Eastern Special Development Zone or the Eastern Economic Corridor (EEC) was created in 2018. It is a major development investment project in Thailand that spans three provinces: Chachoengsao, Chonburi, and Rayong. The EEC has identified target industries that have been promoted in order to increase investment potential development of economic activities and facilitation in the area, including development of human resources and systematic accumulation of technology for a sustainable future in Thailand (EEC, 2019b). It was found that the demand-driven future skill development was on the basis of co-payment from the private sector and other participating sectors (EEC model). Skill development and capacity enhancement of the workforce are required to prepare the manpower which meets the actual requirements of the target industries by collaboration with some international educational institutions and with the aim to upgrade the Thai institutions to be on par with their international counterparts (Muensriphum et al., 2021). Furthermore, there is a lack of future skill study in the EEC zone, which necessitates a large number of industrial work force who can work and meet job requirements (Kwangmuang et al., 2021). Today's research focuses solely on the challenges for student development in the 21st century skills (Thanormchayathawat et al., 2016), or the study of Noimala (2021), who studied the essential work skills of the 21st century in general, rather than for a specific zone, particularly an industrial development zone.

In addition, with a large number of unemployed new graduate students and a lack of skills development research, particularly in the EEC, research on the development of future skills for tertiary students to meet the need of the EEC of Thailand may serve as the mechanism or guideline for higher education institutes to drive the development of tertiary education especially on future skills, so that they have capacity to produce the graduates with the future skills fit for the 21st century to furnish the needs of the target industries of the EEC. The research should benefit the curriculum or study program developers at tertiary institutions which aim to supply the graduates to the EEC labor market and develop the future skills for students to benefit their future work opportunities.

Mostly researchers use a multilevel mixed-method design, that is employed following the measurement model (Edmonds & Kennedy, 2017). In the quantitative research part, the researcher used multilevel confirmatory factor analysis (MCFA) statistic for analyzing the data; and in the qualitative part, the researcher used the content analysis technique (Boun et al., 2020). This study used MCFA with mixed-

method research. The quantitative phase aimed to study the factors and components of future skills whereas qualitative phase aimed to provide some guidelines for developing the future skills of tertiary students to serve the need of the industries in the EEC of Thailand.

Literature Review

The educational system in Thailand is currently undergoing significant change. The opportunities and challenges of the 21st century necessitate the development of skill sets. Globalization and technological advancements have altered how people perform their jobs, interact with one another and their surroundings. As a result of the society's rapid development, the study of 21st century skills emerged. The Partnership, which brings together community, educational, and policy leaders to create a powerful vision for the 21st century education in order to ensure that every child thrives as citizens and employees in the 21st century (Partnership for 21st Century Skills, 2008; 2011). Furthermore, Trilling and Fadel (2009) highlighted some of the major issues confronting the generations of the 21st century and how they reshaped the fundamentals of our societies in novel and highly effective ways. Everyone in charge of education now helps prepare tomorrow's workers and citizens to face the challenges of their time. Trilling and Fadel (2009) and Partnership for 21st Century Skills (2008) developed the 21st century skills, also known as future skills, which include three main factors such as learning and innovation skills; information, media and technology skills; and life and career skills; and eleven components.

Learning and Innovation Skills

Learning and innovation skills (LI) refer to the ability to do or create things well and efficiently by employing new methods or procedures, such as ideas, methods, or innovations, until the work can be done competently (Khongcharoen, 2021). The makeup consists of three components: creativity and innovation skills (CI), critical thinking and problem-solving skills (CP), and communication and collaboration skills (CC). These skills will be essential for the job market in 2025. (World Economic Forum, 2020). Creativity and innovation is the critical component of work, learning, and living. A creative innovation is defined as the evolution or modification of numerous works until they are distinct creative innovations from the start leading to improved change (O'Hara, 2017). Being creative will give you the ability to solve problems by generating new ideas, which will result in the development of innovations.

Critical thinking and problem-solving are essential for effective reasoning, reasonable problem knowledge, and adequate analysis to produce a variety of solutions to challenges (Hitchcock, 2018). Furthermore, communication and collaboration play a role in one's ability to effectively and efficiently communicate their point of view and ideas to others using a variety of tools, as well as their ability to collaborate with others to achieve their goals. Communication is a necessary skill for students to be able to collaborate with others and build networks of ideas (Ferres, 2017).

Information, Media and Technology Skills

Information, media and technology (IMT) skills refer to the ability to understand, manage, and apply IMT (Trilling & Fadel, 2009) and consist of three components. The availability of information and communication technologies impedes social integration and personal development but enhances efficiency of social connectivity. The first component of IMT, information literacy skills (IL), enables students to access information efficiently, critically evaluate and accurately use it to solve problems or control the flow of data from various sources, and use a basic understanding of ethical and legal issues surrounding information access and use (Trilling & Fadel, 2009). The ability to use various forms of technology to access, assess, produce, and critique information is referred to as media literacy (ML) (Domine, 2011;

Trilling & Fadel, 2009). While ICT refer to the gathering and management of information, which includes knowing how to use computers, accessing, analyzing, and managing information, as well as transforming, sharing, and managing data safety, and using data, and data management skills refer to data management (Fraillon et al., 2014).

Life and Career Skills

The principle of happy coexistence in society is life and career skills (LC). LC skills are classified into five components, according to Trilling and Fadel (2009): Flexibility and adaptability skills (FA), initiative and self-direction skills (IS), social and cross-cultural skills (SC), productivity and accountability skills (PA), and leadership and responsibility skills (LR). With the help of LC skills, learners can better manage their lives and work situations in the global economy. In addition to subject-matter knowledge and cognitive abilities, students are expected to develop adequate emotional skills. This enables students to adjust to more demanding working environments, heavy workloads, and looming deadlines, as well as engage and collaborate with others to achieve the goals (Chu et al., 2017).

Moreover, this study used the future skills model of Partnership of 21st Century Skills (2008, 2011) and Trilling and Fadel (2009) which stated that future skills divided into three factors and 11 components as follows: 1) LI consisting of creativity and innovation skills, critical thinking and problem-solving skills, and communication and collaboration skills, 2) IMT consisting of information literacy skills, media literacy skills, and information, communication and technology skills, and 3) LC consisting of flexibility and adaptability skills, initiative and self-direction skills, social and cross-cultural skills, productivity and accountability skills, and leadership and responsibility skills.

Mostly, researchers use confirmatory factor analysis (CFA) to analyze data at individual level, which is single-level CFA, without thinking about the nature of data. However, single-level CFA can be used to adapt to analyze in category by using multilevel confirmatory factor analysis (MCFA). MCFA is used to analyze single-level analysis model that uses the variance-variance matrix to analyze MCFA, to examine the source of variation in the observed variables at both the individual and group (discipline) levels (Muthén & Muthen, 2017). According to Makmee (2021), who studied the learning and innovation skills assessment, MCFA using a mixed-method design was used to show the result in the learning and innovation model. Therefore, this study was implemented to address the problems of Thai tertiary students, particularly undergraduates, who lack skills for their future work. Delaney (2019) and Munintarawong (2018) used MCFA and a mixed-method design to provide a guideline for better future skills development. Figure 1 depicts the concepts of future skills of tertiary students for the industry in Thailand's EEC. Therefore, the following hypotheses were proposed:

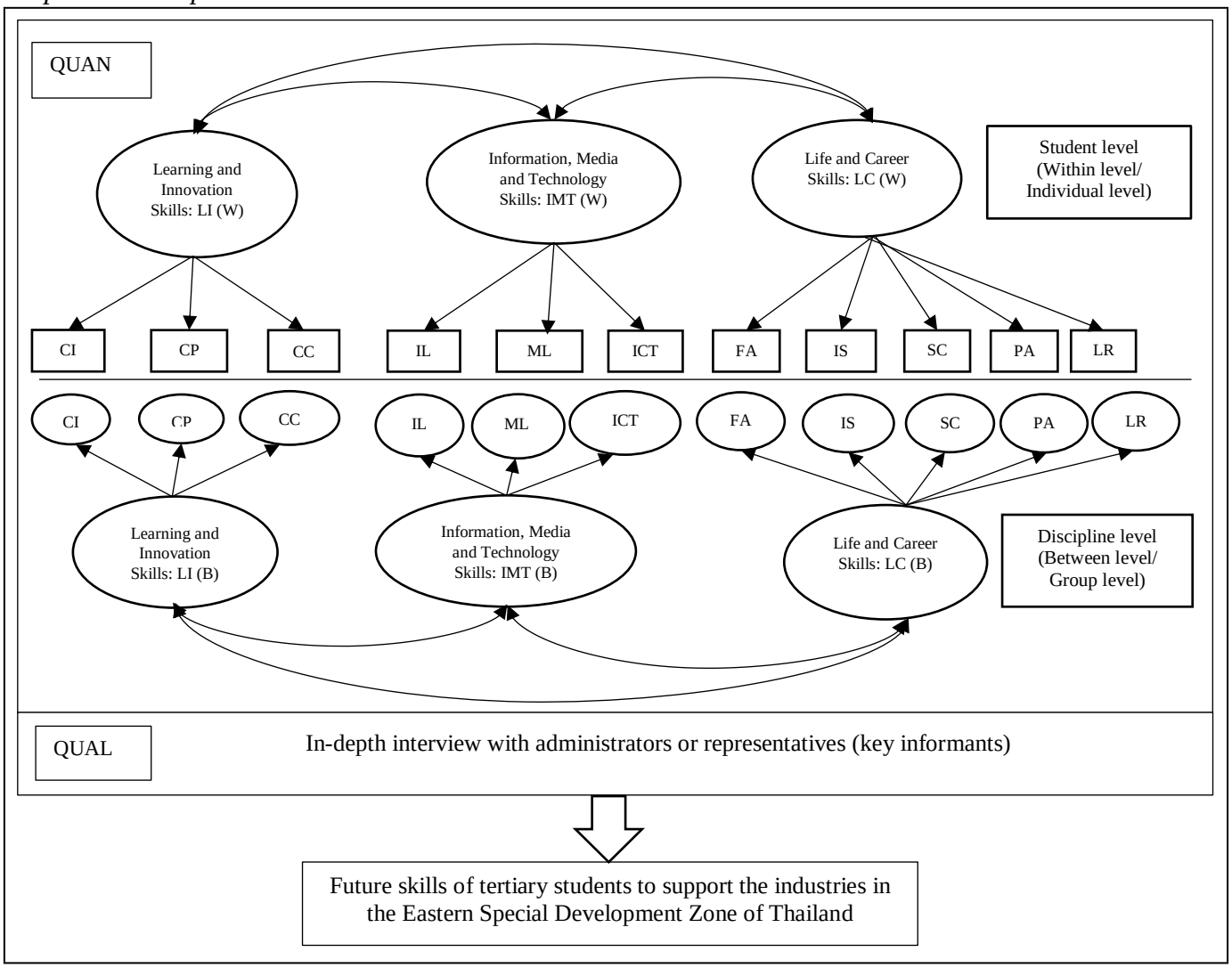
H1: Measurement model for the future skills of tertiary students to serve the industries in the EEC of Thailand at the student and discipline levels is consistent with empirical data.
H2: Guidelines for future skill development of tertiary students at the student and discipline levels to serve the industries in the EEC of Thailand are suitable.

Research Objectives

1) To develop and test consistency of the measurement model for the future skills of tertiary students to serve the need of the industries in the EEC of Thailand at the student and discipline levels, and 2) to develop a guideline of future skills development for tertiary students to serve the industries in the EEC of Thailand at the student and discipline levels.

Figure 1

Proposed Conceptual Framework



Note. 1. Learning and Innovation Skills (LI); 1.1 Creativity and Innovation Skills (CI); 1.2 Critical Thinking and Problem-Solving Skills (CP); 1.3 Communication and Collaboration Skills (CC); 2. Information, Media and Technology Skills (IMT); 2.1 Information Literacy Skills (IL); 2.2 Media Literacy Skills (ML); 2.3 Information, Communication and Technology Skills (ICT); 3. Life and Career Skills (LC); 3.1 Flexibility and Adaptability Skills (FA); 3.2 Initiative and Self-direction Skills (IS); 3.3 Social and Cross-cultural Skills (SC); 3.4 Productivity and Accountability Skills (PA); 3.5 Leadership and Responsibility Skills (LR), W= Student level (Within level/ Individual level), B= Discipline level (Between level/ Group level).

Methodology

The researchers used sequential explanatory mixed-method design, and MCFA to conduct the study both at the student and discipline levels. In this study, quantitative research took the lead, while qualitative research provided support. The data from both methods were then used for analysis and discussion of the results to obtain a complete research answer (Edmonds & Kennedy, 2017) and can be used for the initial quantitative phase of this design, and cross examination of qualitative data phase. In this way, the qualitative data help explain the quantitative result.

Quantitative Phase

Future skills measurement model at the student and discipline levels with three factors was studied in this phase.

Population and Sample

The population of this study were 63,241 students from 10 educational institutions in the EEC. The sample for the first phase was 1,135 tertiary students enrolled in bachelor's degree programs. According to Hair et al. (2014), the sample size should be 10-20 times the observable variables (components), and for MCFA, this study used 227 disciplines and five students per discipline. Hooper et al. (2008) recommended 20 groups or disciplines for MCFA as the minimum, and 50 groups were considered perfectly suitable.

Instruments

A questionnaire with 83 items and rating scale based on the future skills model of Trilling and Fadel (2009) and Partnership for 21st Century Skills (2008, 2011) was developed. The questionnaire was reviewed and approved by three selected experts using Content Validity Index (CVI), and Item- level CVI (I-CVI) and all item 1.00. According to Polit and Beck (2017) I-CVI should equal 1.00, thus meaning that all the items can used in the questionnaire. The rating scale adopted a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The scale had a Cronbach's alpha of .98, which indicated good reliability (Dennis & Vander Wal, 2010).

Qualitative Phase

This phase aimed to confirm the result from the quantitative phase and provide the guideline of future skills development of students. The model of future skills developed in the quantitative phase was used as guideline for in-depth interviews.

Participations

In-depth interviews of ten key informants being administrators or their representatives (selected by purposive sampling) of ten participating institutions in Thai higher education; one from each institution, were selected based on years of working experience. Additionally, a manual for the development of the future skills of tertiary students to support the industries in the EEC development zone at both student and discipline levels was proposed.

Instrument

A semi-structured in-depth interview form validated by three experts was used to assess the appropriateness of the questions and conduct such in-depth interviews with the key informants.

Procedure

Due to the COVID-19 pandemic, the researcher adjusted the data collection approach by adopting social distancing, using online data collection and continuous monitoring. The researcher took four months to collect data between April and July 2022 from 1,135 tertiary students from 227 disciplines in the ten educational institutions in the EEC of Thailand. All questionnaires were returned with a 100 percent response rate.

Results

The results of this study, are presented in two phases, quantitative and qualitative, as follows.

Quantitative Phase

In the quantitative phase, online questionnaires were sent to all the participants. The majority of them were female students (75%), aged between 21 and 22 years old (24%), and third year students (26%). The results of multilevel confirmatory factor analysis of the future skills of tertiary students are shown in Table 1.

Table 1 shows the results of correlation analysis within the level (ICC). It was found that all the three factors of the future skills had the values greater than .05, indicating the data at the student level had variations at the discipline level. The variations at the discipline level of .07 - .08 indicated that the data

had the variations, hence the multilevel analysis might be performed. And the future skills model was consistent with the empirical data indicated by the goodness-of-fit indices.

Table 1
Results of MCFA of the Model for Measuring the Future Skills (Factors)

Variable	Result								
	Student level				Discipline level				ICC
	β	*SE*	*t*	R^2	β	SE	*t*	R^2	
LI	.94**	.01	130.26	.88	.90**	.04	20.20	.82	.07
IMT	.84**	.01	58.86	.70	.93**	.04	20.49	.86	.08
LC	.95**	.01	131.23	.89	1.00**	.00	1327.33	.99	.08
$\chi^2 = .03$, $df = 1$, $\chi^2/df = .03$, $p = .87$, RMSEA = .00, CFI = 1.00, TLI = 1.00, $SRMR_W = .00$, $SRMR_B = .00$									

Note. ** $p < .01$, 1. Learning and Innovation skills (LI); 2. Information skills, Media, and Technology skills (IMT); 3. Life and Career skills (LC)

On considering the significance of the factors in the multilevel confirmatory factor model for measuring the future skills at the student level, it was found that the weights of standard factor (β) for all three factors had positive values with the statistical significance level of .01. The weights of standard factor were ranked in descending order as LC, LI, and IMT with their respective weights of .95, .94, and .84. For the discipline level, the weights of standard factor (β) for all three factors had positive values with the statistical significance level of .01. The weights were ranked in descending order as LC, IMT, and LI with their respective weights of 1.00, .93, and .90.

The correlation coefficient (R^2) at the student level varied from .70 to .89, indicating that the factors could explain 69.90% - 89.40% of the variations. At the discipline level, the correlation coefficient had the values of .82 - .99, implying that the factors could explain 81.80% - 99.50% of the variations.

The results in Table 2 of MCFA of the future skills of tertiary students to support the industries of the EEC in Thailand were consistent with the empirical data indicated by the goodness-of-fit indices with $\chi^2 = 73.62$, $df = 56$, $\chi^2/df = 1.31$, $p = .06$, RMSEA = .02, CFI = 1.00, TLI = 1.00, $SRMR_W = .01$, $SRMR_B = .07$. The results of the MCFA may be ranked in descending order as:

At the Student Level

LC consisted of five components which all had positive standard factor weights with the statistical significance level of .01. The ranking of the standard factor weights was as follows; Flexibility and adaptability skills (FA), initiative and self-direction skills (IS), productivity and accountability skills (PA), social and cross-culture skills (SC), and leadership and responsibility skills (LR) with their respective weights of .86, .81, .77, .76 and .63.

LI consisted of three components which all had positive factor weights with the statistical significance at the level of .01. The ranking of standard factor weights in descending order was as follows: communication and collaboration skills (CC), critical thinking and problem-solving skills (CP), and creativity and innovation skills (CI) with their respective weights of .87, .82 and .72.

IMT consisted of 3 components which all had positive standard factor weight with the statistical significance level of .01. The ranking of standard factor weights was as follows: Information, media, and technology skills (ICT), information literacy skills (IL), and media literacy skills (ML) with their respective weights of .80, .79 and .71.

Table 2

Results of MCFA of the Future Skills (Components)

Variables	Result								ICC
	Student level				Discipline level				
	β	SE	*t*	R^2	β	SE	*t*	R^2	
LI									
CI	.72**	.02	33.87	.52	.89**	.09	9.51	.79	.09
CP	.82**	.02	39.62	.67	.84**	.14	6.10	.70	.05
CC	.87**	.01	74.98	.76	.97**	.05	17.51	.94	.06
IMT									
IL	.79**	.03	26.69	.63	.94**	.10	9.52	.89	.06
ML	.70**	.03	25.16	.50	1.00**	.13	7.59	.99	.07
ICT	.80**	.02	34.03	.64	.88**	.08	11.03	.77	.06
LC									
FA	.86**	.01	66.56	.75	.93**	.05	17.53	.87	.08
IS	.81**	.02	44.60	.66	.97**	.07	14.16	.93	.08
SC	.76**	.02	39.98	.58	.86**	.09	9.21	.75	.06
PA	.77**	.02	40.29	.60	.98**	.06	15.56	.96	.06
LR	.63**	.02	28.64	.40	.79**	.08	10.32	.63	.12

$\chi^2 = 73.62$, $df = 56$, $\chi^2/df = 1.31$, $p = .06$, RMSEA = .02, CFI = 1.00, TLI = 1.00, $SRMR_W = .01$, $SRMR_B = .07$

Note. 1.Learning and Innovation skills (LI); 1.1 Creativity and Innovation skills (CI); 1.2 Critical thinking and Problem-solving skills (CP); 1.3 Communication and Collaboration skills (CC); 2. Information, Media and Technology skills (IMT); 2.1 Information Literacy skills (IL); 2.2 Media Literacy skills (ML); 2.3 Information, Communication and Technology skills (ICT); 3. Life and Career skills (LC); 3.1 Flexibility and Adaptability skills (FA); 3.2 Initiative and Self-direction skills (IS); 3.3 Social and Cross-cultural skills (SC); 3.4 Productivity and Accountability skills (PA); 3.5 Leadership and Responsibility skills (LR).

At the Discipline Level

LC consisted of five components which all had positive factor weights with the statistical significance level of .01. The ranking of the standard factor weights in descending order was as follows: productivity and accountability skills (PA), initiative and self-direction skills (IS), flexibility and adaptability skills (FA), social and cross-culture skills (SC) and leadership and responsibility skills (LR) with their respective weights of .98, 97, 93, 86 and .79.

IMT consisted of three components which all had positive factor weights with the statistical significance level of .01. The ranking of the standard factor weights was as follows: media literacy skills (ML), information literacy skills (IL) and information, communication, and technology skills (ICT) with their respective weights of 1.00, .94 and .88.

LI consisted of three components which all had positive standard factor weights with the statistical significance level of .01, ranking of the standard factor weights in descending order was as follows: communication and collaboration skills (CC), creativity and innovation (CI), and creativity and problem-solving skills (CP) with their respective weights of .97, .89 and .84.

Qualitative Phase

The results of in-depth interview of ten key informants of the participating institutions, one from each institution, revealed that the majority of the informants (90%) were male, aged 41 to 50 (40%), had 11 to 20 years of work experience (40%), and held PhD degrees (80%). Ranking of the factors and the components of the future skills at both student and discipline levels by the key informants of the participating institutions in the in-depth interviews was in line with the quantitative phase. It was found the

results were consistent with the quantitative analysis of the factors and the components. At the student level, it was discovered that the factors were ranked in descending order as LC, LI, and IMT. At the discipline level, the ranking in descending order was LC, IMT, and LI.

When the factors were considered, at the student level, it was found that, for factor 3, LC, flexibility and adaptability skills (FA) were the most important. For factor 1, LI, communication and collaboration skills (CC) were the most important. Information, communication, and technology skills (ICT) were the most important for factor 2, IMT.

At the discipline level, it was found that productivity and accountability skills (PA) were the most important for factor 3, LC. Media literacy skills (ML) for factor 2, IMT, and communication and collaboration skills (CC) were the most important for Factor 1, LI.

There for the guideline to future skills development at student level should first consider developing LC followed by LI, and IMT, and discipline level should first consider developing LC followed by IMT, and LI.

Each course should consider improving students' skills such as flexibility and adaptability skills because they need to adapt themselves in new different working environment to work without much training and be responsible on their tasks.

> Teach them about life skills and new career skills that occurred in crises or bad situations, such as COVID-19, so that they can adapt to any situation. (Key informant 5)
>
> There should be learning through practice. Let the students begin to think and solve problems on their own. (Key informant 6)
>
> Don't just learn in a square room; build as many learning environments as possible. Students should learn in a real-world setting and be able to solve problems without relying solely on textbooks. (Key informant 6)

While for the discipline level, learning content should be focused on productivity and accountability skills.

> We should consult with the industry about the type of graduates they require so that we can produce enough to meet their demands. In the past, they needed graduate students who could be responsible for the given work and adapt to work with others. (Key informant 3)
>
> They sometimes seek students who have initiatives and can begin working without being told or trained numerous times. In addition, job responsibilities are also important. (Key informant 5)

Therefore, the guidelines for developing the future skills of tertiary students should first focus on LC such as teaching how to be flexible and adaptable in the workplace and being a productive and responsible person, followed by learning and innovation skills and information skills, media, and technology skills.

Discussion and Conclusion

This study yields the following future skills of tertiary students, which are important skills for students to enter the future EEC labor market. The quantitative results point out the measurement model of future skills of tertiary students consisting of three factors (Partnership for 21st Century Skills, 2008, 2011; Siri et al., 2017; Trilling & Fadel, 2009). The qualitative results point out the guideline for developing future skills of tertiary students to support Thailand's EEC industries.

The Quantitative and Qualitative Results: At the Student Level

The skills which carried the most factor weight, in descending order, were life and career skills (Paiwithayasiritham & Yanprechaset, 2021), learning and innovation skills (Makmee, 2021; Trilling & Fadel, 2009), and information, media, and technology skills (Hu et al., 2018), and are described as follows.

Life and Career Skills

The multilevel analysis discovered that FA skills were the most important at the student level (Makmee, 2017) for not only students but also those in employment. Because of the impending technological disruption, everyone must quickly adapt to new modes of communication, learning, and living (Trilling & Fadel, 2009). Adaptability is the ability to change perceptions, impacts, and one's own behaviors in a creative way. Individual differences in response to change, new environments, and uncertainty are reflected in adaptability (Martin et al., 2012; VandenBos, 2007). To prevent the spread of coronavirus, people have been barred from almost all of their daily activities and routines. Everyone has had to adjust to the new situation. The ability to be flexible is critical for success in the domains where multiple concepts must be used to understand complex problems, such as biology, physiology, and medicine (Rhodes & Rozell, 2017). The ability to adapt can help predict direct participation of students and has an effect on student engagement via the chain mediation of positive and negative academic emotions (Zhang et al., 2021).

For the development of LC, importance was given to flexibility and adaptability skills. Students should be provided with the opportunity to learn from real life experience or by actual working so that they learn to adapt to the new environment. In the case of a critical situation, they should be given the opportunity to work in the situation. Some centers of learning should be off campus for self-learning. This agrees with Paiwithayasiritham and Yanprechaset (2021) who studied life skill building and working life of teaching students. Their approach for building life skills of teaching students included actualization, incorporation or integration of life skill building with work, and promotion of opportunity for life skill building with actual work. Also, in agreement with this study is the work of Makmee (2019) who studied life skills assessment criteria for high school students in the Eastern Region of Thailand.

Learning and Innovation Skills

The multilevel analysis both at the student and discipline levels revealed that communication and collaboration skills were the most weighted or important factor. This finding is consistent with the findings of Eid and Al-Jabri (2016), who found that university students used social networks for communication, chat, and the exchange of knowledge and documents that are widely available today. According to Trilling and Fadel (2009), communication and collaboration form the ability to efficiently communicate with clear thinking and concepts while paying attention to others. Furthermore, Partnership for 21st Century Skills (2008) stated that communication and collaboration with a team of people from different backgrounds can foster teamwork and improve individual ability. Iksan et al. (2012) also discussed the importance of communication for undergraduate students. Communication was found to be an important skill for communicating with friends, teachers, in group assignments, and in class work presentations (Makmee, 2021; Phanudulkitti et al., 2018).

For LI, importance was given to communication and collaboration skills. This is consistent with the finding of Makmee (2021) who studied learning and innovation skills assessment criteria for upper secondary school students. The researcher found that assignments that required team effort should be given to the students for them to learn communicating with others. Such assignments should be given in their early years, not waiting until the final year of their study. Examination should be problem-based as suggested by Widmann et al. (2016) who conducted a systematic literature review on the impacts of learning behaviors on the behaviors of teams working on innovative work. They learned that learning and innovation development needed collaboration as a team. The research by Witherspoon (2021) indicated that working in a team in which the team members

participated in thinking, synthesis, and consultation often led to the development of high-quality proposals and innovations for organization improvement.

Information, Media and Technology Skills

The multilevel analysis revealed, at the student level, ICT greatly influenced student learning. Communication and technology skills can assist students in self-learning, which can accelerate students' learning results. Communication and technology skills reduce workload and save resources not only in schools but also in the workplace (Ross, 2015). Communication and technological abilities improve work quality, organizational development, smart work techniques, and management (Bresnahan & Yin, 2017; Eid & Al-Jabri, 2016).

For IMT, importance was given to information, communication, and technology skills. Hu et al. (2018) found that ICT had a very strong effect on student academic performance. ICT helped promote students' self-learning which could be a catalyst to push student learning outcome. Not only at school, but also at workplace ICT helped reduce big workload and saved much money (Ross, 2015). ICT at workplace helped in quality improvement, organizational development, and technical and managerial intelligence and also improving the quality of work (Bresnahan & Yin, 2017).

In teaching, teachers should employ teaching media that attract students' interest to avoid students' boredom. Activities which require participation in communication, and self-learning, and problems which require communication and attentive listening should be assigned to the students. Today is in the era of digital technology where information and news may be got via various sources such as television and online social media accessible by students and the general public. All this contributes to everyday learning.

The Quantitative and Qualitative Results: At the Discipline Level

The ranking in descending order was life and career skills, information, media, and technology skills (Bresnahan & Yin, 2017), and learning and innovation skills (Makmee, 2021). All these agree with the work of Noimala (2021) who identified the future skills or the 21st century skills to have three factors, consistent with Partnership for 21st Century Skills (2008, 2011) and Trilling and Fadel (2009), as follows.

Life and Career Skills

For LC, productivity and accountability skills (PA) were given the most weight. The institution responsible for the curricula should collaborate with the private sector. Inputs from the private sector is invaluable for the design of the curricula. The curriculum designer needs to know what the industry expects of the graduates so that the curriculum meets the expectation of the industry. Coaching should be adopted to replace some teaching. Coaching is different from teaching in that it offers advice, help, problem solving, development, and identification of students' potential (Perveen, 2010). Extracurricular activities should be brought in to help with career guidance. For example, speakers from outside may be invited to speak on various subjects including flexibility and adaptation skills (Deák & Wiseheart, 2015). In consistence with this work, Vu and Shah (2016) indicated that student self-direction learning could help student to arrange their learning activity and learning needs which promoted them to get better grade and achievement. Donovan and Paudyal (2016) revealed that student's initiative ability was significant for student working ability which helped them to accomplish their objectives. In addition, Rashid and Asghar (2016) researched self-directed learning and academic performance and found self-directed learning significantly affected academic performance.

Result showed that PA were the most important at the discipline level. Accountability is synonymous with responsibility or answerability; therefore, academic officers should pay more attention to it. They should also ensure that students are enthusiastic about learning and growing as professionals (Alsharif, 2014).

Information, Media and Technology Skills

For IMT, importance was given to ML skills were the most important at the discipline level. Because ML is essential for the society, ML skills are the most important at the discipline level (Ivanovic, 2014). By applying media research to the educational system, it should be integrated into classroom learning and electronic media. Every day, there is a great deal of news. Everyone can use ML to determine the veracity of news. According to Jamali (2015), ML assisted everyone in selecting appropriate news for himself. According to Prakoso et al. (2017), ML for students in a discipline was important for today's globalization because there was a large amount of news that needed to be screened and classified appropriately by strengthening ML.

The curricula should expose the students to the world by giving them the opportunity to study directly from research work or other sources of information, and the opportunity for self-learning and self-evaluation. This agrees with the work of Boun et al. (2020) who worked on the development of multilevel confirmatory factor analysis of 21st century skill model for undergraduate students in Cambodia and found that information, communication, and technology skills were very important for today digital world (Iksan et al., 2012; Partnership for 21st Century Skills, 2011).

Learning and Innovation Skills

For LI, communication and collaboration skills were given the most weight. In any academic discipline, curriculum developers must incorporate more practical work into the curricula, not resorting to lecture only (Kaoian et al., 2018). The curricula must encourage students to come up with communication skills, and work as a team. Makmee (2021) studied learning and innovation skills assessment criteria for upper secondary school students and found that communication help communicates with others effectively and improve confidence in public speaking.

The guideline for developing future skills of tertiary students to support Thailand's EEC industries were crucial for improved learning quality or in creating new invention to help with their work. At the student level, it was discovered that the factors were ranked in descending order as LC (Teeran, 2018), LI, and IMT. For at the discipline level as LC, IMT, and LI, respectively (Trilling & Fadel, 2009; Siri et al., 2017). However, these skills were found to be important for supporting the industries of the EEC in Thailand, with life and career skills being the most important. At the student level, flexibility and adaptability abilities that benefit future employment were the most important. At the discipline level, productivity and accountability skills should be prioritized in the approach to future skill development.

Limitations

The absence of future skill norms construction is a limitation of this study. Although both quantitative and qualitative research were used to develop the future skills model and guidelines, the development of additional standards can help students assess their own skill levels. Future research may thus focus on the development of multilevel or multiple group future skill norms for undergraduate students.

Implications for Behavioral Science

This study attempted to show the three factors of future skills that are crucial for students in an industrialized society. Future skills are the crucial skills for labor market, yet students still lack them. This study provided empirical support for the future skills model for tertiary students in EEC (Partnership for 21st Century Skills, 2008, 2011). Students still lack the following abilities: flexibility, critical thinking, creativity, problem-solving, and cooperation (Delaney, 2019; Nold, 2017). Furthermore, the study's findings have important implications for both students and lecturers who want to work and develop curriculum to meet the needs of the EEC labor market. Thus, improving the aforementioned skills will help students develop new skills that they will need once they graduate and enter the workforce. This study advances behavioral science by illuminating and directing students' future skills so that they can graduate with the skills required by the industry and be able to find work.

Conclusion

The future skills model and guidelines were created to expand knowledge by developing study curriculums for undergraduate students who wish to work in the EEC labor market in Thailand and to reduce the unemployment rate for new graduates. Future related studies on disciplines or curriculums development or skills development can use this result as a guideline to improve their study or research.

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Ethical considerations

This study was approved by Burapha University's Research Ethics Committee. The project number is HU146/2564. The participants signed a research consent form before participating in the process.

References

Alsharif, N. Z. (2014). Knowledge, Skills-and Accountability? *American Journal of Pharmaceutical Education, 78*(9), 159. https://doi.org/10.5688/ajpe789159

Boun, K., Makmee, P., & Wongupparaj, P. (2020). Development of multilevel Confirmatory Factor Analysis of 21st Century Skill Model for Undergraduate Students in Cambodia. *Journal of Educational Measurement, 37*(102), 230 - 239. https://so06.tci-thaijo.org/index.php/JEMEPTB/article/download/248837/168451/881152

Bresnahan, T., & Yin, P. L. (2017). Adoption of new information and communications technologies in the workplace today. *Innovation Policy and the Economy, 17*(1), 95-124. https://www.journals.uchicago.edu/doi/abs/10.1086/688846

Chu, S. K. W., Reynolds, R. B., Tavares, N. J., Notari, M., & Lee, C. W. Y. (2017). Twenty-first century skills and global education roadmaps. In *21st century skills development through inquiry-based learning* (pp. 17-32). Springer. https://link.springer.com/chapter/10.1007/978-981-10-2481-8_2

Deák, G. O., & Wiseheart, M. (2015). Cognitive flexibility in young children: General or task-specific capacity?. *Journal of Experimental Child Psychology, 138,* 31-53. https://doi.org/10.1016/j.jecp.2015.04.003

Delaney, H. (2019). *Education for the 21st Century Placing skills development at the heart of education.* https://www.unicef.org/thailand/stories/education-21st century#:~:text=22%20April%202019,%2Doff%20reform%2C%20but%20continuously

Dennis, J. P., & Vander Wal, J. S. (2010). The cognitive flexibility inventory: Instrument development and estimates of reliability and validity. *Cognitive Therapy and Research, 34*(3), 241-253. 3 https://doi.org/10.1007/s10608-009-9276-4

Domine, V. (2011). Building 21st century teachers: An intentional pedagogy of media literacy education. *Action in Teacher Education, 33*(2), 194-205. https://doi.org/10.1080/01626620.2011.569457

Donovan, G. R., & Paudyal, V. (2016). England's Healthy Living Pharmacy (HLP) initiative: Facilitating the engagement of pharmacy support staff in public health. *Research in Social and Administrative Pharmacy, 12*(2), 281-292. https://doi.org/10.1016/j.sapharm.2015.05.010

Edmonds, W. A., & Kennedy, T. D. (2017). *An Applied Guide to Research Designs: Quantitative, Qualitative, and Mixed Methods.* Sage.

EEC. (2019a). *Mārūam ngān kap rao* [Join Us]. https://www.eeco.or.th/th/job-announcement [in Thai]

EEC. (2019b). *Why EEC? Government Initiative*. https://www.eeco.or.th/en/government-initiative/why-eec

Eid, M. I. M., & Al-Jabri, I. M. (2016). Social networking, knowledge sharing, and student learning: The case of university students. *Computers & Education, 99*, 14-27. https://doi.org/10.1016/j.compedu.2016.04.007

Ferres, J. (2017). Communication efficiency in education: Increasing emotions and storytelling. *Media Education Research Journal, 25*(52), 51-60. https://www.scipedia.com/public/Ferres_Masanet_2017a

Fraillon, J., Ainley, J., Schulz, W., Friedman, T., & Gebhardt, E. (2014). *Preparing for Life in A Digital Age: The IEA International Computer and Information Literacy Study International Report*. Springer Nature.

Hair Jr., J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis: A Global Perspective*. Pearson.

Hitchcock, D. (2018). *Critical thinking.* https://plato.stanford.edu/archives/fall2020/entries/critical-thinking/

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*(1), 53-60. https://academic-publishing.org/index.php/ejbrm/article/view/1224

Hu, X., Gong, Y., Lai, C., & Leung, F. K. S. (2018). The relationship between ICT and student literacy in mathematics, reading, and science across 44 countries: A multilevel analysis. *Computers & Education, 125*, 1-13. https://doi.org/10.1016/j.compedu.2018.05.021

Iksan, Z. H., Zakaria, E., Meerah, T. S. M., Osman, K., Lian, D. K. C., Mahmud, S. N. D., & Krish, P. (2012). Communication Skills among University Students. *Procedia - Social and Behavioral Sciences, 59*, 71-76. https://doi.org/10.1016/j.sbspro.2012.09.247

Ivanovic, M. (2014). Development of Media Literacy – An Important Aspect of Modern Education. *Procedia - Social and Behavioral Sciences, 149*, 438-442. https://doi.org/10.1016/j.sbspro.2014.08.284

Jamali, R. (2015). 4 - Effects of information and media literacy in social movements. In R. Jamali (Ed.), *Online Arab Spring* (pp. 31-40). Chandos.

Kaoian, K., Chanchusakun, S., Songserm, U., & Atthanuphan, M. L., (2018). Kār rwbrwm bthreīyn læa kār reīyn rū̂ k̄ĥām wạt′hnṭhrrm læa p̄hū̂ s̄xn x̀ān cạbcı khwām k̄hxng phās̄′ā thiy sụ̀ng ca c̀hwy ĥî cạdkār reīyn rū̂ bæb nên ĥlạkṣūtr klùm p̄hs̄mp̄hs̄ān citt pạyyā ṣ̣ukṣ̄′ā tām mā nı chận pī thì̀ 6 [The development of social and cross-cultural skills and finding main idea competences in English through group process to integrated contemplative education for Matthayom 6 students]. *Veridian E-Journal, Silpakorn University, 11*(1), 120-135. [in Thai]

Khongcharoen, P. (2021). Thạkṣ̄′a kār reīyn rū̂ læa nwạtkrrm: Khuṇ lạkṣ̄′ṇa khả khạy̱ k̄hxng phllok nı yukh ṣ̄ers̄′ṭ̂hkic thì̀ k̄hạbkhelū̀xn d̂wy nwạtkrrm [Learning and innovation skills: The important characteristic of global citizens in a value-based economy]. *Journal of Humanities and Social Sciences Thonburi University*, *15*(3), 165-177. https://so03.tci-thaijo.org/index.php/trujournal/article/view/251117 [in Thai]

Kwangmuang, P., Jarutkamolpong, S., Sangboonraung, W., & Daungtod, S. (2021). The development of learning innovation to enhance higher order thinking skills for students in Thailand junior high schools. *Heliyon*, *7*(6), e07309. https://doi.org/10.1016/j.heliyon.2021.e07309

Majid, S., Liming, Z., Tong, S., & Raihana, S. (2012). Importance of soft skills for education and career success. *International Journal for Cross-Disciplinary Subjects in Education*, *2*(2), 1037-1042. https://www.academia.edu/download/78313424/f7e83148968b38c525fe7131027dce564b40.pdf

Makmee, P. (2017). Promotion of proactive behavior for government officers in the eastern region: A multilevel model with mixed methods analysis. *ABAC Journal*, *37*(2), 61-74. http://www.assumptionjournal.au.edu/index.php/abacjournal/article/view/3043

Makmee, P. (2019). Kār phạt′hnā keṇṯ̣h kār prameịn thạkṣ̄′a chīwit s̄ảh̄rạb nạkreīyn radạb mạṭhymṣ̣ukṣ̄′ā txn plāy nı p̣hākh tawạnxxk:Kār wikherāaḥ̄ model phh̄u radạb bæb p̄hs̄ān wiṭhī [Development of Life Skills Ȧssessment Criteria for High School Students in the Eastern Region: A Multilevel Model with Mixed Methods Analysis]. *Journal of Humanities and Social Sciences Thonburi University*, *13*(31), 24 – 34. [in Thai]

Makmee, P. (2021). Development of learning and innovation skills assessment criteria for upper secondary school students: A multilevel confirmatory factor analysis using mixed-method design. *Kasetsart Journal of Social Sciences*, *42*(2021), 319-324. https://doi.org/10.34044/j.kjss.2021.42.2.16

Martin, A. J., Nejad, H., Colmar, S., & Liem, G. A. D. (2012). Adaptability: Conceptual and empirical perspectives on responses to change, novelty and uncertainty. *Journal of Psychologists and Counsellors in Schools*, *22*(1), 58-81. https://doi.org/10.1017/jgc.2012.8

Muensriphum, C., Makmee. P., & Wongupparaj, P. (2021). Cross-cultural competence - a crucial factor that affects chinese corporations' business performance in the eastern special development zone of Thailand. *ABAC Journal*, *41*(4), 175-197. http://www.assumptionjournal.au.edu/index.php/abacjournal/article/view/5818

Munintarawong, S. (2018). Pạyh̄ā kār fụ̄kngān læa thạkṣ̄a nı kār th thảngān k̄hxng nạkṣ̣ụkṣ̄ā sāk̄hā wichā phās̄ā yı̀pùn mh̄āwithyālạy ṭhrrmṣ̄āstṛ̀ [Issues related to intership practices among Thammasat University's students majoring in Japanese language]. *JSN Journal*, *8*(3), 206-218. [in Thai]

Muthén, L. K., & Muthen, B. O. (2017). *Mplus Statistical Analysis with Latent Variables User's Guide* (8th ed.). Muthén and Muthén.

Noimala, W. (2021). Thạkṣ̄a c̊ā pĕn k̄hx ngkārthc̊ā ngān nı ṣ̄twrrs̄′ thı̀ 21 [The Essential Work Skills of the 21st Century]. *Ratnabuth Journal*, *3*(1), 45- 57. https://so07.tci-thaijo.org/index.php/rtnb/article/download/595/450/2055 [in Thai]

Nold, H. (2017). Using Critical thinking teaching methods to increase student success: An action research project. *International Journal of Teaching and Learning in Higher Education*, *29*(1), 17-32. https://files.eric.ed.gov/fulltext/EJ1136016.pdf

O'Hara, M. (2017). Rising to the occasion: New persons for new times. *Estudos de Psicologia (Campinas)*, *34*(4), 454-466. https://doi.org/10.1590/1982-02752017000400002

Paiwithayasiritham, C., & Yanprechaset, Y. (2021). Kār s̄erim s̄r̂āng thạkṣ̄a chīwit læa kār thảngān k̄hxng nạkṣ̣ụkṣ̄ā khrū [Enhancing Life and Career Skills of Students Teacher]. *Silpakorn Educational Research Journal*, *13*(1), 132 – 143. https://so05.tci-thaijo.org/index.php/suedureasearchjournal/article/view/247396/171188 [in Thai]

Paprika, Z. Z., & Nagy, V. (2012). Assessment of creativity on the job market. *Procedia Economics and Finance*, *3*, 166-181. https://doi.org/10.1016/S2212-5671(12)00136-0

Partnership for 21st Century Skills. (2008). *21st Century Skills, Education & Competitiveness: A Resource and Policy Guide*. https://files.eric.ed.gov/fulltext/ED519337.pdf

Partnership for 21st Century Skills. (2011). *P21 Framework Definitions: Partnership for 21st Century Skills*. https://files.eric.ed.gov/fulltext/ED519462.pdf

Perveen, K. (2010). Effect of the problem-solving approach on academic achievement of students in mathematics at the secondary level. *Contemporary Issues in Education Research (CIER)*, *3*(3), 9-14.

Phanudulkitti. C., Farris, K. B., Makmee, P., & Kittisopee, T. (2018). Deep approach to learning of pharmacy students: A multilevel analysis. *Pharmacy Education*, *18*(1), 99 – 109. https://pharmacyeducation.fip.org/pharmacyeducation/article/view/585/498

Polit, D. F., & Beck, C. T. (2017). *Nursing Research: Generating and Assessing Evidence for Nursing Practice* (10th ed.). Lippincott Williams & Wilkins.

Prakoso, S. G., Yuliarti, M. S., & Anggreni, L. S. (2017). The importance of social media literacy for students in globalization age. *KnE Social Sciences*, *2*(4), 191-197. https://doi.org/10.18502/kss.v2i4.886

Ramlan, R., & Ngah, S. (2015). Student perception on the importance of soft skills for education and employment. *PEOPLE: International Journal of Social Sciences*, *1*(1), 696-708. https://doi.org/10.20319/pijss.2015.s11.696708

Rashid, T., & Asghar, H. M. (2016). Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations. *Computers in Human Behavior*, *63*, 604-612. https://doi.org/10.1016/j.chb.2016.05.084

Rhodes, A. E., & Rozell, T. G. (2017). Cognitive flexibility and undergraduate physiology students: Increasing advanced knowledge acquisition within an ill-structured domain. *Advances in Physiology Education, 41*(3), 375-382. https://doi.org/10.1152/advan.00119.2016

Ross, P. (2015). *The Impact of Unified Collaboration Technologies in the Workplace*. Griffith University. https://core.ac.uk/download/pdf/143849837.pdf

Rudowicz, E., Tokarz, A., & Beauvale, A. (2009). Desirability of personal characteristics associated with creativity: Through the eyes of Polish and Chinese university students. *Thinking Skills and Creativity, 4*(2), 104-115. https://doi.org/10.1016/j.tsc.2009.06.003

Siri, A., Del Puente, G., Martini, M., & Bragazzi, N. L. (2017). Ethnopsychiatry fosters creativity and the adoption of critical and reflexive thinking in higher education students: insights from a qualitative analysis of a preliminary pilot experience at the Faculty of Medicine and Surgery, University of Genoa, Italy. *Advances in Medical Education and Practice*, *8*, 321. https://doi.org/10.2147/AMEP.S114473

Songsakul, P. (2022). *The crisis of undergraduate students who are unable to find work the most.* https://thestandard.co/bachelor-degree-job-finding-crisis/

Trilling, B., & Fadel, C. (2009). *21st Century Skills: Learning for Life in Our times.* John Wiley & Sons.

Teeran, R., (2018, May 22). *Thaksa dān chīwit læ ʻāchīp samrap kānrīanrū nai satawat thī yīsipʻet* [Life and Career Skills for 21st Century Study]. https://www.runwisdom.com/2018/05/life-and-career-skills/ [in Thai]

Thanormchayathawat, B., Vanitsuppavong, P., Niemted, W., & Portjanatanti, N. (2016). Thạkṣ̄a k̄hxng wạn nî 21: Ch̀wyh̄elūx p̄hû̂ prasb ṗhạy [21st Century Skills: A Challenge for Student Development]. *The Southern College Network Journal of Nursing and Public Health, 3*(2), 208-222. [in Thai]

Thansettakij Digital. (2022, May 20). Dek čhop mai pī la hā sǣn tokngān phung wan phlǣpen Skill Gap [Unemployment of New Graduates Skyrocketed To 500,000 Amidst Fear of 'Skill Gap' Scar]. https://www.thansettakij.com/economy/525563 [in Thai]

VandenBos, G. R. (2007). *APA Dictionary of Psychology*. American Psychological Association.

Vu, H. Y., & Shah, M. (2016). Vietnamese students' self-direction in learning English listening skills. *Asian Englishes, 18*(1), 53-66. https://doi.org/10.1080/13488678.2015.1136104

Widmann, A., Messmann, G., & Mulder, R. H. (2016). The impact of team learning behaviors on team innovative work behavior: A systematic review. *Human Resource Development Review, 15*(4), 429-458. https://doi.org/10.1177/1534484316673713

Witherspoon, A. (2021). The role of team processes in innovation development to sustain learning organizations. *The Learning Organization*, *29*(1), 21-37. https://doi.org/10.1108/TLO-09-2020-0164

World Economic Forum. (2020). *The Future of Jobs Report 2020.* https://www. weforum.org/reports

Zhang, K., Wu, S., Xu, Y., Cao, W., Goetz, T., & Parks-Stamm, E. J. (2021). Adaptability promotes student engagement under COVID-19: The multiple mediating effects of academic emotion. *Frontiers in Psychology*, *11*, 633265. https://doi.org/10.3389/fpsyg.2020.633265