

The Characteristics of the 21st Century Learners of Walailak University Graduates in the Academic Year 2020-2021

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Abstract

A study of “The Characteristics of the 21st century Learners of Walailak University Graduates in The Academic Year 2020-2021” was aimed to 1) Analyse expectations and perceptions of the characteristics of learners in the 21st century, 2) Analyse the factors that affect to the characteristics of graduates in the 21st century. We found that: graduates had high expectations of the characteristics of learners in the 21st century, both in Knowledge skills (3R), Soft skills (8C) and overall. However, they had a perception of the characteristics of 21st century learners in Knowledge skills (3R) and overall at a high level. Meanwhile, they perceive soft skills (8C) to be very high. However, they had a very high perception of 4 aspects arranged in order as follows: 1) Collaboration, Teamwork, and Leadership, 2) Compassion, 3) Cross-cultural, and 4) Career and learning self-reliance. It was found that graduates have perception of the characteristics of learners in the 21st century in 4 aspects at a high level arranged in order as follows: 1) Communication, Information, and Media Literacy, 2) Computing and ICT literacy 3) Critical thinking and Problem-solving and 4) Creativity and Innovation. The perception of factors affect to the characteristics of learners in the 21st century of graduates with different major groups affected their perception of the characteristics of learners in the 21st century in the different Knowledge skills (3R). The five predictive variables together accounted for 63.9% of the characteristics of 21st century learners, including both knowledge skills and soft skills.

Keywords: The learner characteristics in the 21st century, Knowledge skill, Soft skill, Graduates of Walailak University

Introduction

“21st century skills” refers to the knowledge, skills, and work habits required for success in lifelong learning. These skills result from developing a conceptual framework for learning in the twenty-first century resulted from developing the 21st century learning framework by the partnership for 21st century skills, led by Bernie Trilling and Charles Fadel. (Trilling & Fadel, 2009) The 21st century skills: Learning for life in our times proposed that an equation involves 3Rs x 7Cs = The 21st century skill. The 3Rs consist of literacy skills including: 1) Reading, 2) (W) Riting, and 3) (A) Rithmetic; the 7Cs consist of 7 skills, including: 1) Critical thinking and Problem solving, 2) Creativity and Innovation, 3) Cross- cultural understanding 4) Collaboration, Teamwork and Leadership 5) Communication, Information and Media Literacy 6)

Computing and ICT literacy and 7) Career and learning self-reliance. The 21st century skills are the purpose of education and learning, guiding the way to creating a learning process that develops students’ lives to be quality and successful. So, the Office of the Education Council (2017) has established objectives for learner aspirations, which aim to develop all learners with characteristics and learning skills in the 21st century as 3Rs8Cs by adding one more required skill, namely 8) Compassion. The goal of developing skills in the 21st century is to provide students with basic skills of learning, and they must be able to adapt to both life and occupation to succeed in the 21st century. Therefore, it is necessary for education planning across the board, especially higher education management, to generate graduates for the workforce. This requires strategies that

promote learning to equip students with the necessary skills in the 21st century, along with the core subject matter.

From the widely accepted concept of 21st century skills to preparing proposals for comprehensive educational reform, organizing teaching and learning to equip students with 21st century skills depends on many factors. This is consistent with the academic article on Thai education in the 21st century: Productivity and Development Guidelines by Wangsrikoon (2014), which identified factors that will cause the product or student to have the characteristics of learners in the 21st century. It depends on the educational management of the relevant agencies, especially at different levels. Education cannot be successful without organizing learning to lead students to their desired goals.

It is the same as Walailak University under the management of Prof. Dr. Sombat Thamrongthanyawong and the management team executives (2018), and there has been a concrete turning point since 2017. A two strategic plans: one for twenty years, 2018-2037, and the other for a five-years, 2018-2022 (Walailak University, 2017). Strategy 3: Reform instructional approaches using state-of-the-art sciences to establish the university as an internationally recognized institution 4: Produce quality graduates to meet the needs of the National Strategy. The university has systematically planned and developed the quality of education in order to support the identity that needs to promote morally upright and intellectual graduates, ever since developed and enhanced to satisfy the standards, procurement of modern teaching materials and equipment, developing academic potential (intellectual capacity) for faculty members and develop various educational skills for students.

Therefore, to evaluate the successes in developing the quality of graduates in response to the national policy that emphasizes the acquisition of 21st century learning skills. As a result, were 2 Objectives: 1) To study the characteristics of learners in the 21st century according to the expectations and perceptions of Walailak University graduates. The academic year 2020-2021 and 2) To study the factors that affect graduates' perception of learner characteristics in the 21st century, as they are a direct stakeholder in the implementation of graduate development strategies in response to two national strategies. This will be

important information for university administrators to use in developing strategies that promote the development of university operations in various aspects to be more efficient. As a result, university graduates will possess the qualities that make them ideal learners in the 21st century.

Literature reviews

The concept of 21st century skills has gained wide acceptance among academics. There has been an effort to push forward proposals for comprehensive education reform. For example, Tangkitwanit et al (2013) investigated strategies for reforming basic education to promote responsibility. It proposes guidelines for reforming the education system in 5 aspects consisting of 1) Curriculum, Teaching, Media and Technology, 2) Reforming the Educational Measurement and Evaluation System, 3) Reforming the Teacher Quality Development System, 4) Evaluating the Quality of Educational Institutions, and 5) Reforming the Educational Financial System in a way that aligns to develop new century skills for learners. Office of the Education Council (2014) investigated guidelines for Thai education development and preparation for the 21st century, and recommendations for these guidelines are summed up as follows: 1) Goals of education that focus on developing students to be complete in all aspects instead of focusing on academics only. 2) Policies and Strategies in the 21st century must focus on creating an education system that can facilitate real learning by teaching less and Learn More including Lifelong Learning 3) Management must be integrated into the quality control and standards system to ensure effective support and 4) Learning Environment which includes 4.1) Teaching and learning management to focus on the learner as the center that increases capacity and practice skills in lifelong learning and comprehensive learning as well as having Life Skills 4.2) Teachers which change their role from being a knowledge provider to being a counselor 4.3) Curriculum that revised to align with national development recommendations that emphasize learning 4.4) The Assessment which stresses learning development (Formative Assessment) and 4.5) Using information technology in teaching and learning and knowledge management.

In the study of factors affecting students' 21st century skills, Pleumsamrankij (2017) found that 7

external factors—which have been examined contribute to the implementation of teaching and learning and learning aimed at equipping students with 21st century abilities. These factors include: 1) Promotion of 21st century skills by international agencies 2) National Laws, Policies or Plans 3) Community cooperation 4) Development of Technology 5) Teaching and Learning about 21st century skills by external agencies 6) Increasing Knowledge about 21st century skills by external agencies and 7) Students. Furthermore, it found that 7 internal factors: 1) Agency Policy, 2) Budget Allocation, 3) Personnel Knowledge and Competencies, 4) Recognizing the importance of 21st century skills, 5) Educational Materials, Equipment, and Technology offered by the agency 6) Increasing knowledge of 21st century skills within the agency and 7) Creating a learning community professional knowledge and 7) Establishing a professional knowledge-based learning community. Similarly, Jedaman et al (2021) investigated the elements influencing educational administration 4.0 in the context of the 21st century dynamics toward establishing a sustainable ASEAN social and cultural community of Basic Education of Thailand consisting Leadership, Strategic Management, Executive, Instructional Staff, Curriculum and Learning Management, Environment, and Surroundings that support learning.

Therefore, there are the related researches as follows:

Pengpit (2018) addressed the factors that affect the 21st century skills of undergraduate students at Kasetsart University Kamphaeng Saen Campus. The study found that the highest-ranked skills were Collaboration, Teamwork, and Leadership skills, followed by other competencies in descending order. Moreover, the lowest average was mathematic skills. It was found that the student factors, teacher factors and supporting factors affect the efficiency and effectiveness of learning of students in the 21st century and can predict the skill abilities of learners in the 21st century at 54.80%.

Janthangard et al. (2018, p.100) addressed the characteristics of graduate business administration in the 21st century. The study found that the essential characteristics of 21st century business administration graduates include communication, problem solving, teamwork, morals and ethics, information technology, proficiency, creativity, business administration

knowledge, leadership, decision-making, self-learning, responsibility, entrepreneurship, management.

Longlalerng (2019, p.115) addressed desirable physical therapy graduates to strive for success in the workplace in the 21st century. The study found that the desired traits of physical therapy graduates fall into three areas: 1) Professional skills, such as critical thinking in analyzing clinical problems 2) Skills that supplement or enhance professional abilities; and 3) Life Skills that emphasize the significance of Life Long Learning

Boonsin. (2019, p.115) who addressed the desired graduate characteristics of the Bachelor of Public Administration program to aim for professional achievement effective. The study found that effective public sector characteristics include Leadership, Critical Thinking Skills, and Morals and Ethics, while effective private sector and a characteristics consist of Creativity, Interpersonal Relations and Decision Making

Suwannakeeree et al. (2019, p. 115) explored the 21st century learning skills of nursing students at Naresuan University. It was found that the skills ranked the highest mean scores were in Computer, Information Technology and Communication. Moreover, the lowest mean score was reading, writing, and arithmetic.

Chaisen (2020, p. 98-99), who had addressed the Institute's research report on Suranaree University of Technology 21st century Skills Assessment Academic 2019. The study found that the overall 21st century skills of SUT students were at a high level, as indicated by the overall mean score. "Collaboration, Teamwork and Leadership" had the highest mean score while "Communication and Negotiation" showed the lowest mean score.

Chaiwannawat et al. (2020, p. 68) who had addressed perception of 21st century skills of nursing students at Ratchathani University, Ubon Ratchathani Province. It was found that the skill the ranked the highest mean score was Compassion; the later skills were Cross-cultural understanding and math skills at a good level but the smallest mean.

Conclude the research problems

Because the current education system focuses on skill development rather than knowledge acquisition, emphasizing knowledge that brings only the most significant ideas and concepts for students to grasp, is a foundation for further study that will enable them to

develop 21st century abilities. Therefore, it is an important strategy that many parties have jointly researched to create a model and present guidelines for

enhancing the efficiency of education in the 21st century in the future.

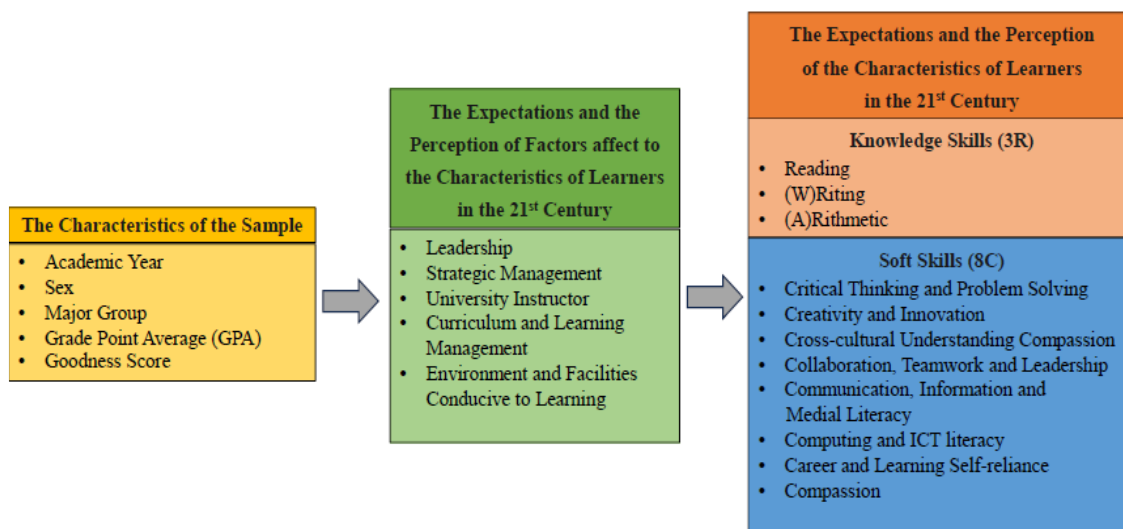


Figure 1 Research conceptual framework

Methodology

Research design

Based on the literature review and suggestions of several studies, this study developed the conceptual framework for the research as follows:

Population and sample group

This research used by research collecting data from 2 groups of samples, totaling 3,633 people. It consisted of 1) graduates who graduated in the academic year 2020, a total of 1,693 people, and 2) graduates who graduated in the academic year 2021, a total of 1,940 people. The random method uses the Yamane equation (Yamane, 1967) at a 99% confidence level, based on a sample size with an error of $\pm 4\%$ – $\pm 5\%$, a total of 1,418 people with the purposive sampling that collected data.

Research tools and data collection

The tool used for this collection was a questionnaire developed. They were then sent to 3 experts to check the Content Validity to find the consistency of the Item-Objective Congruence Index (IOC). The data collected from graduates of the academic year 2020-2021 through a questionnaire distributed on the day of the graduation ceremony; the Academic year 2021.

Content validity

The researcher assigned 3 experts in educational administration, consisting of Asst. Prof. Dr. Kanokkorn Sirisuk, lecturers of the Educational Administration Program, Faculty of Education, Songkhla Rajabhat University, and Dr. Boonsong Thong-ieang, lecturers of Mahamakut Buddhist University and Dr. Supap Sikkapan, Guest Lecturer, to consider checking the suitability of idioms, clarity of content, and conformity with purpose. After that, the suggestions were brought as a guideline for improving the questionnaire. The consistency or index of conformity between each question and its purpose (Index of item, Objective, Congruence, or IOC) was then calculated. It was found that the consistency index was 1 for all questions, and the accepted IOC values had a value between 0.50-1.00 (Thaweerat, 1997). However, the experts would like to adjust the details in the list of questions to provide greater content in accuracy and consistency between study objectives.

Data analysis

Data analysis used in this research to calculate statistical values were as follows: 1) Descriptive Statistics: frequency distribution, percentage, mean, and standard deviation in describing the characteristics of

the sample, the level of expectations, and the level of perception of factors affecting the characteristics of learners in the 21st century and the level of expectations, and the level of perception of the characteristics of learners in the 21st century in various aspects. 2) Reference statistics or inferential statistics were used to test the following hypotheses: 2.1) The mean difference analysis of the two sample groups by t-test was used to compare the difference in the mean, expectation, and perceived level of the characteristics of learners in the 21st century in different areas in both overall and each aspect. Moreover, it was used to compare expectations and perceptions of the characteristics of learners in the 21st century in each aspect and overall, as classified by graduates. 2.2) Analysis of Variance (ANOVA): To compare the average expectation and perception of the characteristics of learners in the 21st century in each aspect and overall, classified by two or more sample groups. Moreover, if the differences were found, multiple comparative analyses were conducted using the Least Significant Difference (LSD) method to find out which pairs differ at a statistically significant level. 2.3) Multivariate Analysis of Covariance (MANCOVA): to study the relationship between the perception of factors affecting the characteristics of learners in the 21st century of graduates with different Major groups affected their perception of the characteristics of learners in the 21st century. Lastly, 2.4) Multiple Regression Analysis: to study the relationship between the perception of factors affect to the characteristics of learners in the 21st century to the perception of the characteristics of learners in the 21st century of graduates who Graduated in the Academic year of 2020-2021.

Results

Demographic characteristics of the sample group

According to the sample group of 1,418 graduates from the academic year 2020-2021, their background data or demographic characteristics were summarized as follows: most of the graduates were female (78.0%), most of the graduates who graduated in the academic year 2021 (52.4%) and graduated from the Humanities and Social Sciences group (43.0%). Following this, 54.8% of graduates had a GPA below 3.00, and the

majority (62.6%) received a goodness score between 100 and 200.

The expectations and the perception of factors affect the characteristics of learners in the 21st century of graduates who Graduated in the Academic year 2020-2021.

According to the study of the expectation and the perception of factors affect the characteristics of learners in the 21st century of graduates who Graduated in the Academic year of 2020-2021, the study found that graduates' expectations and perceptions of factors affecting 21st century learner characteristics aligned in the same direction across five aspects, arranged in the following order: University instructor, Curriculum and learning management, Environment and facilities conducive to learning, Strategic management, and Leadership. However, the study found that graduates' expectations exceeded their perceptions. Their overall expectation across five aspects was at a very high level (Mean = 4.30), while their overall perception was also at a very high level but slightly lower (Mean = 4.10). Similarly, they perceived four aspects at very high level, except for University instructor that, which was the only factor rated at a very high level (Mean = 4.22).

According to the study of the expectation of factors that affect the characteristics of learners in the 21st century by aspects, it was found that the expectation of the University instructor, was highest at a very high level (Mean = 4.38). When examining expectations by issue, graduates had the highest expectation for teachers applying teaching methods and innovations to enhance students' learning skills, which was rated at a very high level. This was followed by the expectation of the curriculum and learning management, which was at a very high level (Mean = 4.30). When considering the expectations by issue, it was found that graduates had the highest expectation of the curriculum focusing on active learning by giving students hands-on experience rather than listening to lectures, including training and practice in actual workplace settings, which was highest at a very high level. There was an expectation that the environment and facilities would be conducive to learning at a very high level (Mean = 4.29). When considering the expectation by issue, it was found that graduates had the highest expectation of enhancing elements that support high standards and quality in

teaching and learning, such as those found in the Living and Digital Library, Digital Laboratory, and Information Systems required for contemporary education was highest at a very high level. Strategic management was expected at a very high level (Mean = 4.27). When considering the expectations by issue, graduates had the highest expectation for emphasizing the creation of a modern of learning environment and resources that support continuous learning, and effectively aid teaching and learning activities. This was followed by the expectation to promote activities that help students develop intellectual and social skills, fostering quality student to have knowledge and morals, discipline, responsibility, a public mind, and be both a “morally upright and intellectual graduates” was highest at a very high level. The least expectation was for leadership, rated at a very high level (Mean = 4.23). When considering the expectations to commit to developing University instructor ‘s abilities and competencies, focusing on students should be prioritized in the same way that the expectation of creating a learning and knowledge- based society through innovation, technology, and creativity was highest at a very high level.

The study found that among the factors affecting the characteristics of 21st century learners, University Instructor had the highest perception, rated at a very high level (Mean = 4.22), and was the only factor classified at this level. When considering the perception by issue, it was found that graduates had the highest perception of the teacher’ s staff communicating effectively in speaking, writing, and presenting in an appropriate format. Each student was at a very high level. It was followed by the perception of curriculum and learning management, which was at a high level (Mean = 4.11). When examining the expectations by issue, graduates had the highest perception of the curriculum focusing on active learning which emphasizes hands- on experience over traditional lectures, including training and practice in real workplace settings. This was rated a high level. There was a high level of perception of the environment and facilities conducive to learning management (Mean =

4.08). When examining perception by issue, graduates had the highest perception to organizing activities or procedures that enable students to analyze, synthesize, evaluate, and create regularly to enhance their talents, which was rated at a high level. Additionally, strategic management was also perceived at a high level (Mean = 4.08). When examining perception by issue, graduates had the highest perception to enhancing instructors’ competencies to improve education in all respects, such as utilizing The United Kingdom Professional Framework (UKPSF) to increase teaching efficiency. Additionally, there was a high perception of the necessity of creating a modern learning environment and resources that support continuous learning and effectively aid teaching and learning activities. Both were rated at a high level. Moreover, there was the least perception of leadership at a high level (Mean = 3.99). When considering the perception to commitment to developing university instructors’ abilities and competencies, focusing on students should be prioritized in the same way that the perception of creating a learning and knowledge- based society through innovation, technology, and creativity was highest at a high level.

The expectations and the perception of the characteristics of learners in the 21st century of graduates who Graduated in the Academic year of 2020-2021.

According to the study of the expectation and the perception of the characteristics of learners in the 21st century of graduates who Graduated in the Academic year of 2020-2021, it was found that graduates had high expectations of the characteristics of 21st century learners, particularly in Knowledge Skills (3R), Soft Skills (8C) and overall at a very high level (Mean = 4.35). But they had the perception of the characteristics of learners in the 21st century in Knowledge Skills (3R) and overall at a high level except for Soft Skills (8C) they had the perception at a very high level (Mean = 4.19) and considering the average of expectations and perceptions of learner characteristics in the 21st century, classified in each aspect as follows:

Table 1 The expectations and the perception of factors that affect the characteristics of learners in the 21st century of graduates who Graduated in the Academic year of 2020-2021.

Expectation			Perception		
Factor	Mean	Level	Factor	Mean	Level
University instructor	4.38	Very high	University instructor	4.22	Very high
Curriculum and learning management	4.30	Very high	Curriculum and learning management	4.11	High
Environment and facilities conducive to learning	4.29	Very high	Environment and facilities conducive to learning	4.08	High
Strategic management	4.27	Very high	Strategic management	4.08	High
Leadership	4.23	Very high	Leadership	3.99	High
Overall	4.30	Very high	Overall	4.10	High

1. *Knowledge skills (3R)*, it was found that graduates had expectations of the characteristics of learners in the 21st century overall at a very high level (Mean = 4.29) and 3 aspects as follows: Reading (Mean = 4.35), (W) Riting (Mean = 4.30) and (A) Rithmetic (Mean = 4.22). While they had perception overall and each aspect at a high level arranged in order as follows: Reading (Mean = 4.16), it was found that graduates had the highest perception of the ability to accurately understand information content according to its context, which was rated at a very high level. (W)Riting (Mean = 4.10), it was found that the graduates had the highest perception of a ability to write and spell words accurately in grammar at a very high that the highest issue in Knowledge Skills (3R). While they had the perception of (A)Rithmetic (Mean = 4.00) in both issues, an ability to calculate rapidly and accurately and an ability to apply mathematical and statistical principles in daily life consistently and appropriately at a very high level that 2 issues are lowest in Knowledge Skills (3R).

2. *Soft skills (8C)*, it was found that graduates expected the characteristics of learners in the 21st century overall at a very high level (Mean = 4.37) in the same way that they had the perception in 8 aspects or 8C at a very high level. However, they had a very high perception in 4 aspects arranged in order as follows :1) Collaboration, Teamwork, and Leadership (Mean = 4.31); that they had the highest perception of respect and appreciation of the value of team members' flexibility, helpfulness, and compromise to accomplish common

goals. 2) Compassion (Mean = 4.30), which means they had a the highest perception of complying with regulations and laws and being punctual. 3) Cross-cultural understanding (Mean = 4.27), which means that they had a highest perception of acceptance and always respected people from different cultures. Moreover, 4) Career and learning self-reliance (Mean = 4.22), that they had the highest perception of enthusiasm for learning new things / something to expand one's expertise to be up to date continuously. (and expand it constantly.)

While graduates perceived the characteristics of 21st century learners at a high level in four aspects, arranged in the following order: 1) Communication, Information, and Media Literacy (Mean = 4.20), they had the lowest perception to listening and understanding and listening to communicate information efficient properly and satisfies the goals in each issue. 2) Computing and ICT literacy (Mean = 4.18), they had the lowest perception of the ability to manage information ethically and convey information using proper information systems per the law. 3) Critical thinking and Problem solving (Mean = 4.16), they had the lowest a perception of ability to analyze the causes of problems and to distinguish issues from various aspects critically. Moreover, 4) Creativity and Innovation (Mean = 4.14), that they had the lowest perception the ability to apply or expand on prior knowledge to transform various talents into new knowledge or inventions in a concrete and creative manner.

Table 2 The expectations and the perception of the characteristics of learners in the 21st century of graduates who Graduated in the Academic year of 2020-2021.

Skill	Expectation			Perception	
	Mean	Level		Mean	Level
Knowledge Skills (3R)	4.29	Very high	Knowledge Skills 3R	4.09	High
Reading	4.35	Very high	Reading	4.16	High
(W)Riting	4.30	Very high	(W)Riting	4.10	High
(A)Rithmetic	4.22	Very high	(A)Rithmetic	4.00	High
Soft Skills (8C)	4.37	Very high	Soft Skills 8C	4.22	Very high
Critical thinking and Problem solving	4.32	Very high	Critical thinking and Problem solving	4.16	High
Creativity and Innovation	4.32	Very high	Creativity and Innovation	4.14	High
Cross-cultural understanding	4.38	Very high	Cross-cultural understanding	4.27	Very high
Collaboration, Teamwork and Leadership	4.42	Very high	Collaboration, Teamwork and Leadership	4.31	Very high
Communication, Information and Medial Literacy	4.37	Very high	Communication, Information and Medial Literacy	4.20	High
Computing and ICT literacy	4.36	Very high	Computing and ICT literacy	4.18	High
Career and learning self-reliance	4.39	Very high	Career and learning self-reliance	4.22	Very high
Compassion	4.42	Very high	Compassion	4.30	Very high
Overall	4.35	Very high	Overall	4.19	High

The hypothesis

According to the hypothesis of this study, the results of the hypothesis test were summarized after testing statistical data as follows:

1. Graduates with different demographic characteristics had different expectations and perceptions of the factors the affecting the characteristics of learners in the 21st century and had different expectations and perceptions of the characteristics of learners in the 21st century

1.1 Graduates with different demographic characteristics had different expectations and perceptions of factors affecting learners' characteristics in the 21st century.

According to the hypothesis testing by T-test, it was found that graduates with different sexes and academic year had expectations and perceptions of factors that affect the characteristics of learners in the 21st century in Leadership, Strategic management, University instructor, Curriculum and learning management, Environment and facilities conducive to learning and Overall were not statistically different.

Moreover, it was found that graduates with different grade point averages and goodness scores had perceptions of the characteristics of learners in the 21st century in Leadership, Strategic management,

University instructor, Curriculum and learning management, Environment and facilities conducive to learning, and Overall was not statistically different. However, the graduates with different Major groups had perceptions of the characteristics of learners in the 21st century in 5 aspects and were statistically different.

1.2 Graduates with different demographic characteristics had different expectations and perceptions of the characteristics of learners in the 21st Century.

The hypothesis testing by T- test found that graduates of different sexes had no statistically significant differences in their expectations and perceptions of the characteristics of 21st century learners in Knowledge Skills (3R), Soft Skills (8C), and Overall. Graduates with different academic years had expectations of the characteristics of learners in the 21st century in Knowledge Skills (3R), and Soft Skills (8C) and Overall were not statistically different, as well as graduates with different academic years had perceptions of the characteristics of learners in the 21st century in Knowledge Skills were not statistically different. However, they had perceptions of the characteristics of learners in the 21st century in soft skills (8C), and overall, they were statistically different.

Moreover, from analyzing variance (One-way ANOVA), it was found that graduates with different Major groups, grade point averages and goodness scores had expectations of the characteristics of learners in the 21st century in Knowledge Skills (3R), Soft Skills (8C) and Overall were statistically different. As well as, graduates with different Major groups had perceptions of the characteristics of learners in the 21st century in Knowledge Skills (3R), Soft Skills (8C), and Overall were statistically different. However, graduates with different Major groups, grade point averages and goodness scores had perceptions of the characteristics of learners in the 21st century in Knowledge Skills (3R), Soft Skills (8C), and Overall were not statistically different.

2. Analysis of the relationship between perceptions of factors that affect learner characteristics in the 21st century that affect perceptions of learner characteristics in the 21st century, classified by major groups.

The test of differences in mean expectations and perceptions of 21st century learner characteristics based on the sample's demographic characteristics found that major group was the only variable that significantly affected graduates' expectations and perceptions of 21st century learner characteristics among those who graduated in the academic year 2020-2021.

In this regard, the Major groups of the graduates are classified into 3 groups consisting of the group of Humanities and Social Sciences, Science and Technology, and Health Science to analyze Multivariate Analysis of Covariance (MANCOVA) to study the relationship between perceptions of learner characteristics in the 21st century, including Knowledge Skills (3R), Soft Skills (8C) and Overall by using perceptions of factors that affect learner characteristics in the 21st century all 5 aspects and overall as a covariate; statistics showed the results of the intercept test of the model and the differences between groups in the perception of learner characteristics in the 21st century that were statistically significant. The graduates are aware of the factors that affect the characteristics of learners in the 21st century, which are ordered as follows: University instructor, Environment and facilities conducive to learning, Curriculum and learning management, Overall, Strategic management,

and Leadership. Therefore, perceptions of factors affecting the characteristics of 21st century learners of graduates from different Major groups affect their perceptions of the characteristics of 21st century learners differently.

Additionally, when examining the Structure Matrix, consider how views of 21st century learner traits are categorized based on the graduate's Major groups. It displays the canonical variables' correlation coefficient by contrasting the values of the component weights. The analysis revealed that the canonical variables had a very high correlation coefficient, which enabled accurate group classification. As a result, it is possible to conclude that characteristics of learners in the 21st century, include Knowledge Skills (3R), and Soft Skills (8C), Overall, the classification of graduates' Major groups varies greatly, Knowledge skills (3R) are the most important, followed by soft skills (8C) and overall skills.

3. Analysis of the relationship of perception of factors affect to the characteristics of learners in the 21st century that affect the of perception of characteristics of learners in the 21st century

Following the advent perception of factors affect to the characteristics of learners in the 21st century of graduates who graduated in the academic year of 2020-2021 include: Leadership, Strategic management, University instructor, Curriculum and learning management, Environment and facilities conducive to learning and overall as a predictive variable that will affect the perception of student characteristics in the 21st century by using multiple regression analysis to test the multiple correlation coefficient and the quadratic multiple correlation coefficient as well as analysis of variance to test the significance of the multiple correlation coefficient, it was found that the correlation coefficients of 5 variables and overall were statistically significant at the 0.000 level that there is a relationship between the variables and factors that affect the characteristics of learners in the 21st century all 5 aspects and overall affects to the perception of the characteristics of learners in the 21st century, including Knowledge Skills (3R), Soft Skills (8C) and Overall. The 5 predictive variables, which jointly forecast the characteristics of learners in the 21st Century, are grouped as follows: Curriculum and Learning

Management accounted for 54.2%, Environment, and facilities conducive to learning accounted for 50.5%, Strategic management contributed for 45.5%, teaching

staff contributing for 43.8%, Leadership accounted for 42.1% and Overall accounted for 63.9%.

Table 3 Correction analysis between the independent variable and discriminant variable (Structure matrix)

	Function	
	1	2
Knowledge skill (3R)	0.999*	0.038
Soft skill (8C)	0.861*	0.331
Overall	0.743*	0.467

Table 4 The Multiple Regression Analysis of the Perception of Factors affect to the characteristics of learners in the 21st century that Affect the perception of Characteristics of learners in the 21st century

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Model	Sum Square	df	Mean Square	F	Sig.
Leadership	0.649a	0.421	0.419	0.46337	Regression	220.611	4	55.153	256.873	0.000
					Residual	303.382	1413	215	***	
					Total	523.993	1417			
Strategic management	0.675a	0.455	0.453	0.45724	Regression	246.660	4	61.665	294.957	0.000
					Residual	295.408	1413	209	***	
					Total	542.068	1417			
University instructure	0.662a	0.438	0.436	0.45229	Regression	225.109	4	56.277	275.109	0.000
					Residual	289.047	1413	205	***	
					Total	514.156	1417			
Curriculum and learning management	0.736a	0.542	0.541	0.40295	Regression	271.584	4	67.896	418.151	0.000
					Residual	229.432	1413	0.162	***	
					Total	501.016	1417			
Environment and Facilities conducive to learning	0.711a	0.505	0.504	0.48364	Regression	337.493	4	84.373	360.713	0.000
					Residual	330.510	1413	0.234	***	
					Total	668.003	1417			
Overall	0.800a	0.639	0.638	0.31773	Regression	252.934	4	63.234	626.365	0.000
					Residual	142.647	1413	0.101	***	

Discussion and conclusion

1. Graduates who completed their studies in the academic year 2020- 2021 perceived factors that affect the characteristics of 21st century learners.

According to the study, graduates rated the University instructor as the only factor perceived at a very high level at a very high level. If considered together with perceptions in other aspects as follows, Curriculum and learning management that recognizes the university's focus on Active Learning, Strategic

Management that to enhancing instructors' competencies to improve education in all respects, such as by utilizing The United Kingdom Professional Framework (UKPSF) to increase teaching efficiency, as well as, perception to emphasizing the necessity of creating a modern of learning environment and resources that can learn every time, effectively supports teaching and learning activities. There was the perception of the leadership that to commit to

developing University instructors' abilities and competencies focusing, on students should be prioritized in the same way that the perception of creating a learning and knowledge-based society through innovation, technology, and creativity. It shows the quality of the university's teachers, consistent with the university's emphasis on developing their professional quality by implementing a teaching and learning management system that meets international standards, namely The United Kingdom Professional Standards Framework (UKPSF). It is an approach to teaching and learning that emphasizes developing students' thinking, analyzing, and synthesizing skills rather than rote memorization—a concept that fosters lifelong learning abilities. This aligns with Strategy 3: Reform instructional approaches by integrating state-of-the-art sciences so that the university gains recognition as an international-standard institution and a strategic leader 4: Produce quality graduates to meet the needs of the National Strategy. This was consistent with Pengpit (2018), who addressed the factors affecting the 21st century skills of undergraduate students at Kasetsart University Kamphaeng Saen Campus. The study found that teacher factors and supporting factors affect the efficiency and effectiveness of student learning in the 21st century

2. The perception of the characteristics of learners in the 21st century of graduates who Graduated in the Academic year of 2020-2021.

According to the study, according to the study, graduates perceived that 21st century learners possessed high levels of Knowledge Skills (3R) Reading, (W) Riting, and (A) Rithmetic with (A) Rithmetic skills being the least perceived. This was consistent with Pengpit (2001, p. 97), who found that the skill with the lowest average was mathematic skills. It was also consistent with Suwannakeeree et al. (2019, p. 115), who had addressed exploring 21st century learning skills of Nursing Students, Naresuan University. The lowest mean score was found to be reading, writing, and arithmetic. It was also consistent with Chaiwannawat et al. (2020, p. 68), who had addressed the perception of 21st century skills of nursing students at Ratchathani University, Ubon Ratchathani Province. This is consistent with the International Standard Student Competency Assessment (Programme for International

Students), also known as PISA scores (Turakij, 2022), which found that Thai students have the lowest skill scores in mathematics, science, and reading in 20 years. were math skills at a good level but the smallest mean

When considering the perception of 21st century learners' characteristics in Soft Skills (8C), researchers found that graduates perceive themselves at a very high level in four aspects, arranged in the following order: 1) Collaboration, Teamwork, and Leadership 2) Compassion 3) Cross-cultural understanding and 4) Career and learning self-reliance. This was consistent with Pengpit (2018, p. 97), who found that the skills ranked from the highest to the lowest were Collaboration, Teamwork and Leadership skills, Collaboration, Teamwork and Leadership skills. It was also consistent with Chaiwannawat et al. (2020, p. 68), who found that skills in compassion, discipline, morality, and ethics were good. Next, the research showed skills in understanding different cultures and paradigms; these were also good. This is consistent with Chaisen (2020, p. 98-99), who addressed the Institute's research report on Suranaree University of Technology 21st century Skills Assessment Academic 2019. Collaboration, Teamwork, and Leadership" had the highest mean score, while "Communication and Negotiation" had the lowest.

Researchers found that graduates have high expectations for the characteristics of 21st century learners in four aspects, arranged in the following order: 1) Communication, Information, and Medial Literacy 2) Computing and ICT literacy 3) Critical thinking and Problem solving and 4) Creativity and Innovation This was consistent with

Suwannakeeree et al. (2019, p. 115), found that the skills ranked with the highest mean score were Computer, Information Technology, and Communication. It was also consistent with Longlalerng (2019, p. 115) who addressed the desire of physical therapy graduates to strive for success in the workplace in the 21st century. Researchers found that desired physical therapy graduate traits include three areas: 1) Professional skills, such as critical thinking in analyzing clinical problems 2) Skills that supplement or enhance professional abilities and 3) Life Skills that emphasize the significance of Life Long Learning. It was also consistent with Boonsin (2019, p.115) who addressed the desired graduate characteristics of the Bachelor of

Public Administration program to aim for professional achievement. Researchers found that Leadership, Critical Thinking Skills, Morals, and Ethics are characteristics of an effective public sector, and characteristics of an effective private sector consist of Creative, Interpersonal Relations, and Decision Making. It was also consistent with Janthangard et al. (2018, p. 100), who had addressed the Characteristics of Graduates Business Administration in the 21st century. Researchers found that characteristics of the required business administration graduates in the 21st century are characterized by communication, problem-solving, teamwork, morals and ethics, information technology, creativity, business administration knowledge, leadership, decision-making, self-learning, responsibility, entrepreneurship, management, and self-learning. This is consistent with Chaisen (2020, p. 98-99), who found that communication and negotiation had the lowest averages.

Although graduates are percept of factors that affect the characteristics of learners in the 21st century in aspects of environment and atmosphere that are conducive to learning, there is perception of the issue of organizing activities or processes that encourage students to think analytically, synthesize, evaluate and create things to develop skills for students consistently. Furthermore, the university has revised the curriculum in general education classes by arranging for teaching subjects such as innovation and entrepreneurship, philosophy, ethics, critical thinking, knowledge inquiry and research methods, information technology in the digital era, artificial intelligence, and data analytics for health, artificial intelligence for living and working in sciences and technologies and artificial intelligence for living and working in humanities and social sciences that may not be enough. Thus, the university must consider ways to encourage graduates to have more skills in 4 aspects by considering the format of organizing more activities outside the classroom.

3. The factors affect the characteristics of learners in the 21st century of graduates who graduated in the Academic year of 2020-2021

According to the study, the factors affect the expectations and the perception of the characteristics of learners in the 21st century. The graduates from Major groups, which is a demographic characteristic variable

and the only factor affecting the characteristics of learners in the 21st century with statistical significance. In this regard, the Major groups of graduates to analyze Multivariate Analysis of Covariance (MANCOVA) concludes that graduates from different major groups perceive the factors affecting the characteristics of 21st century learners of graduates from different Major groups affect their perceptions of the characteristics of 21st century learners differently. As a result, it is possible to conclude that characteristics of 21st Century, learners include Knowledge Skills. Soft Skills Overall, the classification of graduates' major groups varies greatly Knowledge skills are the most important, followed by soft skills, and overall. Because the university has set the highest GPA upon admission for the group of Health Science, followed by the group of Science and Technology

and the group of Humanities and Social Sciences. This was consistent with Pengpit. (2001, p. 110-111) Major groups have statistically significantly different levels of proficiency in students' skills in the 21st Century.

Following the advent of perception of that factors affect the characteristics of learners in the 21st Century. arranged in order as follows: Curriculum and Learning, Environment atmosphere conducive to learning, Strategic management, teaching staff, and Leadership, which jointly predict the characteristics of learners in the 21st century accounted for 63.9%. This was consistent with Jedaman et al. (2021), who had addressed developing educational management 4.0 under the 21st century Dynamics Era towards Sustainable ASEAN Socio-Cultural Community of Thai's Basic Education; it was found that student factors will contribute another portion, accounting for 36.1%, particularly in the section that stems directly from students' learning behaviors.

Synthesize the overall finding as new knowledge by setting the mind-mapping

Based on the results of the study mentioned above. Researchers found that the five predictive variables sorted as follows: curriculum and learning management, environment and facilities conducive to learning, strategic management, university instructor, and leadership together predicted the characteristics of learners in the 21st century both knowledge skills, soft skills and overall got 63.9%, the remaining 36.1% came

from the knowledge and abilities of the students. Therefore, the management team executives still need to formulate strategies to develop students to have the characteristics of learners in the 21st century in the future by still focusing on Knowledge skills (3R) and Soft skills (8C) in 4 aspects at a high level arranged in order as follows: 1) Communication, Information and Media Literacy 2) Computing and ICT literacy 3) Critical thinking and Problem solving and 4) Creativity and Innovation by focusing on curriculum and learning management, environment and facilities conducive to learning. Developing the curriculum, instructional strategy selection, and student development activity planning should emphasize acquiring 21st century learning skills specific to each major group. The graduate will possess traits that will enable them to have prosperous professions in the future.

Recommendations

1. To support the factors that affect the characteristics of learners in the 21st Century

1) The University instructor encourages the teacher's staff to apply teaching methods and innovations to develop students with the most effective learning skills.

2) The Environment and facilities conducive to learning management: to enhancing elements that support high standards and quality in teaching and learning, such as those found in the Living and Digital Library, Digital Laboratory, and Information Systems required for contemporary education, as in the same time, to organizing activities or procedures that students enable to analyze, synthesize, evaluate, and create things in order to enhance their talents.

2. Develop the characteristics of learners in the 21st century in each aspect as follows:

1) Knowledge skills

1.1) Reading: Strengthen the skill to read and interpret content more accurately.

1.2) (W) Riting: Strengthen skill to write articles or express opinions thoughts concisely and has euphemistic expressions.

1.3) (A) Rithmeti : Strengthen skills to calculate rapidly and accurately and ability to apply mathematical and statistical principles in daily life consistently and appropriately.

2) Soft skills

2.1) Communication, Information, and Media Literacy: Encourage the learners to be able to search for information, analyze it, and apply their judgment in reflection to evaluate the value of information, avoid persuading and instead listen and comprehend in order to convey information clearly and effective according to purpose.

2.2) Computing and ICT literacy: Encourage learners to manage information ethically and present information using appropriate and more legal information systems. In particular, it needs to abide by legislation such as the Personal Data Protection Act (PDPA).

2.3) Critical thinking and Problem- solving: Encourage the learners to adapt and integrate diverse perspectives from various groups of people. It enables adaptation to various situations and groups of individuals while maintaining high performance.

2.4) Creativity and Innovation: Strengthen skills to apply or expand on prior knowledge to transform various talents into new knowledge or inventions in a concrete and creative manner.

Suggestions for further study

1. Studying the components of learner characteristics in the 21st century by using confirmatory factor analysis to consider component weights and consistency with empirical data.

2. Qualitative research will investigate the characteristics of graduates in the 21st century in each area to find the result that develops students according to student demands.

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