Developing Teachers to Enhance Project Management Skills for Students

Chawalit Nukoonkan[1,*] & Phrakru Dhammapissamai[1]

[1]Mahamakut Buddhist University, Isan Campus, Khon Kaen Province, Thailand

*Correspondence: Mahamakut Buddhist University, Isan Campus, Khon Kaen Province, Thailand. Tel: 66-879-473-866

Abstract

This study is an operation within the research project of "Teachers' Development to Enhance Their Project Management Skills for Students," which is also one of the projects in the research plan or research project series regarding 21st-century skills. This project arose from an awareness of the opportunities from the knowledge-based society, as well as from the present digital society, and has processed different views related to project management, which have been published globally via the internet by applying the Research and Development Methodology so that an educational innovation could be created in accordance with the concept of "Knowledge and Action are power." The aim was to empower the teachers' learning first and then to have them apply their learning outcomes to develop their students afterwards. Furthermore, it was believed that so long as teachers are stimulated and encouraged to apply their learning outcomes, then the teaching would become more efficient. As a result, an educational innovation called an "Online Self – Training Program for Developing Teachers to Enhance the Project Management Skills of Students" has been created. It was tested by the stakeholder teachers, who used the program, and was also tested through the process of experimental field research. Thus, it was determined to be efficient as it was hypothesized by showing the possibility of disseminating the program for the useful purpose of developing the teachers and then the students in the educational opportunity extension schools under the Office of the Basic Education Commission of the Ministry of Education, which is also the target population to whom the research results will be disseminated.

Keywords: 21st century skills, project management skills, online self – training program, research and development

1. Introduction

A project was a unique, transient endeavor, undertaken to achieve planned objectives, which could be defined in terms of outputs, outcomes, or benefits. A project is usually deemed to be a success if it achieves the objectives according to the acceptance criteria, within the agreed time scale and budget. Time, costs, and quality are the building blocks of every project. Project management is the application of processes, methods, skills, knowledge, and experiences to achieve specific project objectives according to the project acceptance criteria within the agreed parameters. Project management has final deliverables that are constrained by a finite time scale and budget. (Association for Project Management, n.d.) Project management is important for the following reasons :1) it ensures that what is being delivered is right, and that the real value with respect to business opportunities is delivered and will bring leadership and direction to projects; 2) it ensures that there's a proper plan for executing the strategic goals; 3) it ensures that the proper expectations are set around what can be delivered, by when, and for how much; 4) it ensures that the quality of whatever is being delivered will consistently hit the mark; 5) it ensures that risks are properly managed and mitigated so that issues can be avoided; 6) it ensures that the proper project management processes are followed throughout the project life cycle; 7) it ensures the a project's progress is tracked and reported properly and that there is a degree of expertise in the subject matter; and 8) it ensures that management and learning from successes and failures is achieved. (Aston, n.d.).

Effective Project management requires project management skills. A project management skill set includes learning technical and hard skills (i.e., project planning, scoping the project, writing a project brief, hosting a project kickoff meeting, road mapping the project, mapping your project timeline, managing tasks, and implementing soft skills, such as collaboration, teamwork, communication, time management, leadership, organization, problem solving,

critical thinking, adaptability, and conflict resolution) (Martin, 2022).

Developing an individual's project management skills with principles, concepts, technique, methods, and new activities is vital for society in the 21st century since society has become more knowledge-based and digital than in the 20th century. The literature review, which focused on the principles, concepts, technique, methods, and activities in 21st century by Bruce (2014), Kangan Institute (2020), Rob (2016), Tamara (2020), Ben (2020), Esther (2017), Fred (2020), Moira (2019), Jory (2019), Damien (2017), and David (n.d.), was utilized as a guideline for developing project management skills. Various suggestions were found, such as taking a course from a professional organization, conducting a post-mortem a previous project, establishing firm goals or objectives, choosing the right people for the right jobs, prioritizing, defining project management, setting-up and managing budgets, identifying and embracing strengths and weaknesses, boosting morale, addressing problems early, setting-up future successes with small wins, asking for feedback, setting realistic expectations, determining project milestones and tasks, learning from projects, thinking critically, being creative, keeping clear and accessible schedules, emphasizing accountability, organizing resources in one place, utilizing project management software, studying successful project management methodologies, teaching project management skills to a colleague, refreshing communication skills, perfecting a balancing act, finding the right project management tools, being tech savvy, running a conference, becoming qualified, making sure that 'if at first you don't succeed, plan, plan, and plan again,' getting things on paper, managing the processes, planning projects, documenting development, controlling the projects, listening actively, and engaging regularly with the team.

The previous information not only shows the importance of project management, but also the importance of the development of it in the individual, as well as the scope of the diversity of the suggestions on how to do so. Therefore, since the research team works in education, these suggestions on how to develop project management skills are worth studying and applying as developmental guidelines to enhance the skills of the students in the educational opportunity extension schools under the Office of the Basic Education Commission of the Ministry of Education. For this reason, students are stimulated and encouraged during classes to take action in order to develop a concept of project-based learning, as well as to take action on project-based learning, which also requires project management skills. To apply those suggestions, the researchers followed the concept of "Knowledge and Action are power." by first empowering the teachers and then having them apply their learning outcomes to the processes of developing their students in accordance with the belief that if teachers are stimulated and encouraged to apply their learning outcomes in their teaching, it will result in greater power and effectiveness.

Ultimately, the researchers gave priority to research and development in creating an educational innovation called an "Online Self – Training Program for Developing Teachers to Enhance the Project Management Skills of Students." The hypothesis was that so long as the study followed Research & Development (R&D) methodology, it would result in the creation of an efficient educational innovation in accordance with the set criterion. Moreover, it would be able to be disseminated to empower the teachers' learning, which would then lead to the students' development in the educational opportunity extension schools under the Office of the Basic Education Commission of the Ministry of Education, which was also the target population of this study. The reason was that according to the principles of R&D methodology, when an innovation is piloted in an experimental area that represents a population, it can then be disseminated among the referred groups of the population after its efficiency has been tested and confirmed. Moreover, if it were an online self – training program, which had been developed in the digital era (unlike the document-based programs of the past), its usefulness would double since it can be more widely disseminated in less time and at a much lower cost.

1.1 Research Objectives

The study aimed at reviewing the literature regarding the principles, concepts, techniques, methods, and activities in the 21st century, which could be used as guidelines to develop project management skills by applying R&D methodology to create the online self – training program for developing teachers to enhance the project management skills of students. This program needs to be disseminated in order to empower teachers' learning, and later, it needs to be applied to their learning outcomes in order to develop their students in accordance with the concept of: "Knowledge and Action are power." The program was comprised of: 1) a project to empower the teachers' learning in the areas of definitions, importance, qualities, developmental guidelines, developmental procedures, and the evaluation of project management skills and 2) a project for the teachers, who can apply their learning outcomes to teaching students project management skills in terms of developing team building skills, enthusiasm skills, delegation skills, problem-solving skills, leadership skills, and communicative skills. For the first project, there were

6 modules that focused on the online self – training program, as well as one operational guideline for the teachers in the second project.

1.2 Research Hypothesis

The researcher team reviewed the literature regarding the project management skills of the 21st century believing that it would assist in creating an efficient educational innovation. On the internet, there are many points of view in different aspects from many countries, which were utilized to study and to build an online self – training module. In addition, the stakeholder teachers were tasked with evaluating the quality of the module twice. A research tool was created and tested in a school, which had been randomly selected as an experimental research area. Therefore, it could be presumed that the developed an "Online Self – Training Program for Developing Teachers to Enhance the Project Management Skills of Students" would be efficient in accordance with the follow set criteria: 1) the post-test scores of the teachers' learning outcomes would be in accordance with the standard criterion of 90/90 and would be higher with a statistical significance than the pre-test, and 2) the post-test scores of the students' project management skills assessment would be higher than the pre-test with a statistical significance.

1.3 Literature Review

This study began with the review of literature regarding the project management skills in order to study academic suggestions in many aspects from various points of view in order to create 6 modules of the online self-training program as follows: 1) the definitions from the perspectives of Birt (2020), Glassdoor (2020), Harned (n.d.), the Mind Tools Content Team (n.d.a), Project Management Institute (n.d.), and Valchev (n.d.), 2) the importances from the perspectives of Aston (n.d.), Cleverism (n.d.), Ku (2018), Talent Garden (2021), and Teamwork (n.d.), 3) the qualities from the perspectives of Kelly (2020), Monica (2014), Number8 (2019), PM Tips (2019), Reddy (2018), Singh (n.d.), Thinking Portfolio (2018), Tyler (2017), and Villanova University (n.d.), 4) the developmental guidelines (principle-based approaches, concepts, techniques, methods, or activities) from the perspectives of David (n.d.), Esther (2017, Jory (2019), Moira (2019), Rob (2016), and Tamara (2020, 5) the developmental procedures from the perspectives of Morton (2017), and Reh (2019), and 6) the evaluations from the perspectives of Doctemplates.net (n.d.), Salapatas (2000), and the Mind Tools Content Team (n.d.b).

Based on the literature review on the six topics, the research team identified a range of perspectives related to principle-based approaches, concepts, techniques, methods, or activities as explicit knowledge that is crucial for enhancing the project management skills. These perspectives provide important insights into diverse development approaches. The team synthesized 45 development approaches, as follows:

1) Taking a course from a professional organization

2) Performing a post-mortem on past projects

3) Establishing firm goals or objectives

4) Choosing the right people for the right jobs

5) Prioritizing

6) Defining project management

7) Setting-up and managing budgets

8) Identifying and embracing strengths and weaknesses

10) Boosting morale

11) Addressing problems early

12) Preparing for success by having small wins

13) Asking for feedback

14) Setting realistic expectations

15) Defining project milestones and tasks

16) Learning from projects

17) Applying critical thinking

18) Keeping clear and accessible schedules

19) Emphasizing accountability

20) Organizing resources in one place

21) Utilizing project management software

22) Studying successful project management methodologies

23) Utilizing technical skills

24) Teaching project management skills to a colleague

25) Refreshing one's communication skills

26) Perfecting the balancing act

27) Finding the right project management tools

28) Having leadership skills

29) Performing risk management

30) Performing conflict management

31) Having expertise on certain subject matter

32) Employing time management

33) Being adaptable

34) Being tech savvy

35) Having interpersonal skills

36) Running a conference

37) Becoming qualified

38) Taking action on the concept of "If at first you don't succeed, plan, plan, and plan again,"

39) Writing things down and getting them on paper

40) Participating in process management

41) Conducting project planning

42) Developing documentation

43) Conducting project control

44) Listening actively

45) Being creative

46) Regularly engaging with the team.

2. Research Methodology

2.1 Concept and Procedures

Research and Development (R&D) methodology was applied in the research according to Sanrattana (2018), an educational innovation, which has been developed from the application of R&D methodology and which aims at developing "people," will then lead to the development of the "work." It is believed that if a knowledgeable person is stimulated and encouraged to put his or her knowledge into action, it will result in the power and efficiency of the work according to the concept of "Knowledge and Action are power," which will lead to "the empowerment of teachers' learning to later develop their students." The following outlines the research procedures:

Procedure 1: Project management skills and the like were studied in terms of definitions, importance, qualities, developmental guidelines, developmental procedures, and evaluations in order to build an online self – training program consisting of 6 modules and a manual, which served as a practical guideline for the teachers. (Please see the characteristics of the original Thai modules from https://anyflip.com/ghmpw/jolv/)

Procedure 2: The quality of the Online Self – Training Program was tested twice by using focus group discussions as follows: 1) the Preliminary Field Testing and Revision was conducted with 5 teachers at a school outside the experimental research area and 2) the Main Field Testing and Revision was carried out with 10 teachers at a school outside the experimental research area.

Procedure 3: Two sets of research tools for the experimental research were developed as follows: 1) teachers' learning outcome test and 2) student's project management skills evaluation.

Procedure 4: The Online Self – Training Program was piloted at Banhuaikhaennonsung School, which had been specifically selected as an experimental research area. There was a one group pre-test and a one group post-test for the 13 teachers and 30 students during the second semester the Academic Year of 2022. There were 2 phases of this procedure as follows: 1) a 1-month operation of the project for empowering the teachers' learning using 6 Online Self – Training Modules, which included a pre-test and a post-test for the teachers, and 2) a 2-month operation of the project in which the teachers applied their learning outcomes in teaching in order to develop their students, which included a pre-test and post-test.

2.2 The Research Tool

• Teachers' learning outcome test was a 36-item Google Form with 4 multiple choice answers each. The objective of the test was to assess the teachers' learning outcomes before and after the experimental research. The test was written in accordance with the content regarding definitions, importance, qualities, developmental guidelines, developmental procedures, and the evaluation of the project management skills, which were placed in the online self – training modules. The characteristics of the test were based on the cognitive domain according to The Revised Taxonomy 2001 by Benjamin S. Bloom, which is ranked from the lower thinking skills to the higher ones as follows: remembering, understanding, applying, analyzing, evaluating, and creating (Armstrong, 2010). The test was evaluated for its quality in the following aspects. Firstly, the content validity was measured by employing the method of Rovinelli and Hambleton (1977), which is called the Indices of Item-Objective Congruence (IOC), as well as by 5 senior experts in the fields of Curriculum and Educational Measurement. The results of the data analysis indicated that the IOC of each item in the test had been higher than the criterion of 0.50 (Chaichanawirote & Vantum, 2017). Secondly, the practicality of the test had been determined by piloting the test with 30 teachers at a school outside the experimental research area. The results of the data analysis showed that the index of difficulty for each item in the test had been consistent with the criterion, which had been between 0.20-0.80, as well as the power of discrimination, which had been between 0.20-1.00. The KR-20, which shows the reliability coefficient, had been 0.90, which was higher than the criterion of 0.70 and 0.62 for the index of difficulty of the test.

• The evaluation of the student's project management skills consisted of a 40-item Google Form with a 5-rating scale ranging from 'the most,' 'much,' 'medium,' 'a little,' and 'the least.' The evaluation was built in accordance with the study of the indicative characteristics of project management skills by Kelly (2020), Monica (2014), Number8 (2019), PM Tips (2019), Reddy (2018), Singh (n.d.), Thinking Portfolio (2018), Tyler (2017), and Villanova University (n.d.), as well as the study of the concept of evaluating the project management skills by Doctemplates.net (n.d.), Salapatas (2000), and the Mind Tools Content Team (n.d.b). The evaluation was tested for its quality in the following aspects. Firstly, the content validity was performed by employing a procedure by Rovinelli and Hambleton and by using 5 senior experts in Educational Administration and Educational Evaluation. The results of the data analysis showed that the IOC of every item in the evaluation had been higher than the 0.50 criterion, which meant the items in the evaluation, used in this research, could be applied to the objectives that needed to be evaluated (Chaichanawirote & Vantum, 2017). Secondly, the practical aspects of the evaluation were carried out by performing a pilot study with 30 students in a school outside of the experimental research area. The results of the data analysis showed that alpha coefficient of reliability of the whole evaluation had been 0.86. When analyzing each aspect, the following results were found: 0.85 for team-building skills, 0.80 for enthusiasm skills, 0.86 for delegation skills, 0.88 for problem solving skills, 0.87 for leadership skills, and 0.89 for communicative skills, respectively. When the reliability coefficient was compared with the set criterion, it had been equal to or higher than 0.70 (UCLA: Statistical Consulting Group, 2016), which meant that the items had had a relatively high internal consistency.

2.3 Data Analysis

Regarding the analysis of the teachers' post-test scores, they were compared to the 90/90 standard criterion, in which the first 90 refers to the percentage of the average score of the whole group of the teachers, and the second 90 refers to percentage of the teachers, who had passed all objectives of the evaluation (Yamkasikorn, 2008). The analysis of both the teachers' and students' pre-test and post-test were compared using t – test dependent.

3. Research Results

As mentioned earlier, the objective of the testing of the teachers' learning outcomes after the experiment of the first project ("The Project of Learning Development of Teachers") was to see whether the online self – training modules,

which had been developed, had had any an impact on the learning outcomes of the experimental group of 13 teachers according to the 90/90 standard criterion. Additionally, it was also to determine whether the teachers' learning outcomes after the experimental program had been higher with a statistical significance than before the experiment. Furthermore, after the teachers had applied their learning outcomes to their teaching of the target group of 30 students as the main part of the second project entitled "The Project of Teachers' Application of Their Learning Outcomes to Their Teaching and Development of Students", the goal was to ascertain from the evaluation whether the students had scored higher after the experiment than before it. The results were as follows:

3.1 The Research Results from the Project of the Learning Development of Teachers

The results of the learning outcomes of the teachers after the experiment compared with the first 90 from the 90/90 standard criterion showed that the teachers had had an average score of 33.31 out of the total score of 36 (92.52%). which was higher than the set criterion of 90.

The results of the learning outcomes of the teachers after the experiment compared to the set standard criterion of the second 90 showed that 96.15% of the teachers had also been able to pass the test with respect to all set objectives with a higher score than the set criterion of 90.

The results of the data analyses of the statistically significant differences between the average scores of the pre-test and post-test indicated that the teachers had scored 368/36 on the pre-test with an average of 28.31 and 433 on the post-test with an average of 33.31. After the numbers had been analyzed using the t – test dependent, it was found that those teachers in the experimental group had scored higher after the experiment than before with a statistical significance at the level of 0.05 as shown in Table 1.

Table 1. The Results of the Comparison of the Average Scores of The Pre-Test and Post-Test of the Teachers Using the t – test Dependent

Testing	Sample sizes	Means	Standard Deviations	t
Pre-test	13	28.31	2.98	5.241*
Post-test	13	33.31	1.25	

* $p < 0.05$

3.2 The Research Results from the Project of the Teachers Applying Their Learning Outcomes to Their Teaching to Develop Their Students

The results of the evaluation of 30 students' project management skills before and after the experiment are shown in Table 2.

Table 2. The Results of the Evaluation of the Students' Project Management Skills before and after the Experiment

The Indicative Characteristics of the Students' Project Management Skills	Evaluation Results			
	Pre-test		Post-test	
	$\bar{\chi}$	S.D.	$\bar{\chi}$	S.D.
Team-building Skills	3.67	0.84	3.85	0.70
• Students coordinate with their teammates to complete the tasks quickly.	3.43	0.77	3.60	0.67
• Students set clear work guidelines within their teams.	3.47	0.90	3.80	0.55
• Students use polite language when carrying out their coordinating activities.	3.57	0.90	3.73	0.83
• When there is a conflict within the team, the students can reconcile their differences.	3.40	0.86	3.73	0.69
• Students always adjust their work processes to make them more efficient for their teams.	3.87	0.73	3.93	0.64
• Students seek new ways so that their teams can work faster.	3.73	0.87	3.83	0.79
• Students share responsibilities and value each of their teammates.	4.03	0.85	4.13	0.73
• Students are flexible and willing to work together to achieve their goals.	3.83	0.87	4.03	0.72

The Indicative Characteristics of the Students' Project Management Skills	Evaluation Results			
	Pre-test		Post-test	
	$\bar{\chi}$	S.D.	$\bar{\chi}$	S.D.
Enthusiasm Skills	3.67	0.89	3.89	0.79
• Students are always enthusiastic about their learning.	3.57	0.82	3.97	0.93
• Students think 'outside the box' regarding the information that they have.	3.33	0.84	3.60	0.67
• Students are always optimistic.	3.70	0.88	3.83	0.70
• Students often find fun in their work.	3.87	1.07	4.10	0.92
• The students always accept reasonable changes.	3.70	0.75	3.77	0.73
• Students often look at the good side of their tasks.	3.83	0.95	4.10	0.80
Delegating Skills	3.63	0.75	3.78	0.70
• Students think and plan ahead of time.	3.37	0.76	3.53	0.68
• Students appropriately delegate work to others.	3.80	0.66	3.83	0.65
• Students clearly inform others about the responsibilities.	3.60	0.72	3.80	0.81
• Students explain the importance of the work beforehand.	3.70	0.88	3.93	0.64
• Students provide tools that can help them to finish the work faster.	3.53	0.68	3.73	0.69
• Students set clear deadlines for submissions.	3.77	0.82	3.87	0.73
Problem-solving Skills	3.47	0.84	3.72	0.78
• Students quickly learn new ways to solve problems.	3.27	0.78	3.40	0.72
• Students have various options to solve problems.	3.47	0.97	3.83	0.87
• Students have skills to understand problems and to solve them.	3.80	0.89	3.97	0.76
• Students analyze the causes of the problems.	3.23	0.77	3.57	0.73
• Students choose the best ways to solve problems.	3.70	0.79	3.90	0.76
• Students plan when they solve problems.	3.17	0.75	3.43	0.82
• Students always follow up after solving problems.	3.63	0.89	3.97	0.81
Leadership Skills	3.66	0.80	3.91	0.74
• Students listen to other people's opinions.	3.80	0.71	4.00	0.64
• Students always try to learn new things.	3.37	0.67	3.57	0.57
• Students notice when there is something wrong with their teams.	3.90	0.76	4.00	0.79
• The teammates can easily approach one another.	3.23	0.82	3.87	0.78
• Students have self-esteem.	3.83	0.87	3.90	0.80
• Students take responsibility for their work.	3.63	0.72	3.93	0.83
• Students are ready to give advice and are open to opportunities with their teammates.	3.87	1.04	4.13	0.78
Communicative Skills	3.38	0.85	3.71	0.79
• Students appropriately present information and content to the audience.	3.60	0.89	3.90	0.84
• Students openly propose ideas without any biases.	3.10	0.84	3.43	0.90
• Students present ideas in an interesting manner and talk about any problems.	3.47	0.78	3.53	0.68
• Students often succeed in verbal communication.	3.83	0.83	3.87	0.73
• Students can write efficiently in order to express their thoughts.	3.17	0.75	3.60	0.86
• To prevent misunderstandings, students summarize ideas and important issues periodically.	3.13	1.01	3.90	0.76
Totals	3.58	0.83	3.81	0.75

When the t – test dependent was used for data analysis, it was found that on average, the students had had higher scores after the experiment at the level of statistical significance of 0.05 than before the experiment. The results are shown in Table 3.

Table 3. The Results of the Data Analysis Comparing the Average Scores from the Students' Pre-tests and Post-tests

Evaluations	Sample sizes	Means	Standard Deviations	t
Pre-test	30	3.58	0.83	9.802*
Post-test	30	3.81	0.75	

* $p < 0.05$

The research results showed that the online self – training program had been efficient according to the following research hypotheses. Firstly, the teachers' post-test scores had been consistent with the 90/90 standard criterion. In addition, the scores after the experiment had been higher than before the experiment with statistical significance. Secondly, the post-test scores of the student's project management skills had been higher than the pre-test with statistical significance Therefore, it is possible for this educational innovation to be disseminated to schools which are the target population for the dissemination of this innovation.

4. Discussions and Suggestions

The results of this study led to an efficient online self-training program to enhance teachers' project management skills for students which was in accordance with the set criterion. As can be seen from the results of data analysis as shown above, it was found that the first project, which was "The Project of the Learning Development of Teachers" had been efficient according to the following research hypotheses. Firstly, the teachers' post-test scores had been consistent with the 90/90 standard criterion. Secondly, the post-test scores had been higher than the pre-test with statistical significance. The post-test scores of the student's project management skills had been higher than the pre-test with statistical significance in The second one, "The Project of the Teachers' Application of Their Learning Outcomes to Teaching Students" The results of this research showed the importance and usefulness of the applied concepts. Firstly, there was the concept that "Knowledge and action are power," which is in accordance with an interesting warning statement: "*Knowledge is power: You hear it all the time, but knowledge is not power. It's only potential power. It only becomes power when we apply it and use it. Somebody who reads a book and doesn't apply it, they're at no advantage over someone who's illiterate. None of it works unless YOU work. We have to do our part. If knowing is half the battle, action is the second half of the battle.*" (Kwik, n.d.) Researchers, developers, and administrators should always keep this statement in mind when pursuing research, development, and/or administration. Moreover, they should not adhere to old concepts, which only focus on the importance of the knowledge, such as in the statement: "Knowledge is Power." Secondly, there is the concept of "developing teachers first and then stimulating them to apply their learning outcomes to develop students afterwards." This is a developing concept of the teaching profession, which has been agreed upon by academics. In all of its aspects, teacher development should consider the impacts and results of the students' learning, which is in accordance with the following statement: "Student achievement should be the ultimate goal of any teacher professional development activities (Prodigy, 2019)." There is another statement: *"The most effective professional development engages teams of teachers to focus on the needs of their students. They learn and problem solve together in order to ensure all students achieve success (Mizell, 2010)."* This serves as another reminder to anyone, who is seeking to develop teachers. In addition, the following efficient guidelines for the development of teachers should be applied: a) setting specific student-oriented goals, b) narrowing one's focus down to 1 or 2 goals, c) making learning collaborative and hands-on, d) providing support throughout the implementation process, e) revisiting & tracking goals, and f) having realistic expectations (TUIO staff, 2022)**.** Thirdly, there is the importance of using online self-training programs to assist in developing teachers. Since this is **t**he era of the 'digital technology society,' people can gain access a broad spectrum of learning and self-development opportunities ranging from viewing e-learning and training videos to receiving support from online networks and groups. The following are advantages of such tools: 1) learning in a stress-free manner, 2) receiving career enhancing skills, 3) gaining a sense of purpose, and 4) learning in ways that suit one's own style (The Indeed Editorial Team, 2022). Aside from reading materials, other types of media, such as videos, should, nevertheless, also be considered. This online tool also reminds us that despite the advantages of online self-learning, such as its convenience, flexibility, affordability, its support for more interactions, and the provision of further learning opportunities, there are some limitations that are worth considering. For example, it may create a sense of isolation, may require more self-discipline, may require additional training for the instructors, is prone to technical issues, and may require more screen-time (Thompson, 2022). Fourthly, In the development of teacher learning towards the continuous development of students, attention should be paid to a range of perspectives related to principle-based approaches, concepts, techniques, methods, or activities resulting from the relevant

literature was studied in Item 4 and the research team synthesized 45 development approaches (please refer to the complete list in Item 4). Finally, the indicative characteristics of the students' project management skills used in this research consist of team-building skills, enthusiasm skills, delegation skills, problem solving skills, leadership skills, and communicative skills, but from the study of related literature, it was found that there are many more Therefore, in the future, other researchers may define different or additional indicative characteristics from those used in this research.

In summary, from the overall research results demonstrated the effectiveness of introducing R&D methodology, according to Sanrattana (2018), used in this research that "*an educational innovation, which aims at developing "people," will then lead to the development of the "work." It is believed that if a knowledgeable person is stimulated and encouraged to put his or her knowledge into action, it will result in the power and efficiency of the work according to the concept of "Knowledge and Action are power," which will lead to "the empowerment of teachers' learning to later develop their students."*

References

Armstrong, P. (2010). *Bloom's taxonomy*. Vanderbilt University Center for Teaching. Retrieved from https://bit.ly/3MjhSoe

Association for Project Management. (n.d.). *What is project management?* Retrieved from https://bit.ly/3ZMgVIn

Aston, B. (n.d.). *Why is project management so important to an organization?* Retrieved from https://bit.ly/3KhFWVQ

Birt, J. (2020, February 5). 20 Skills every project manager should have. Retrieved from https://indeedhi.re/2Vo18Ey

Chaichanawirote, U., & Vantum, C. (2017). Evaluation of content validity for research instrument. *Journal of Nursing and Health Sciences*, *11*(2), 105-111.

Cleverism. (n.d.). *Project management*. Retrieved from https://bit.ly/3itszW9

David, L. (n.d.). *How to become a project manager the eight skills needed on the path to project management.* Retrieved from https://bit.ly/3kadmXU

Doctemplates.net. (n.d.). *Interview evaluation forms & templates*. Retrieved from https://shorturl.at/oyPR2

Esther, C. (2017, August 22). *8 Vital project management skills.* Retrieved from https://bit.ly/33vk0Bt

Glassdoor. (2020, June 29). *Project management skills: Definition and examples.* Retrieved from https://bit.ly/37leZhf

Harned, B. (n.d.). *Project management defined: What does a project manager do?* Retrieved from https://bit.ly/3CoGeWg

Jory, M. (2019, December 4). *What makes a great project manager? The 10 most crucial project management skills for 2019 (and how to develop them).* Retrieved from https://bit.ly/3hBBj96

Kelly, S. M. (2020, June 16). *7 Traits of effective project managers.* Retrieved from https://bit.ly/3iuBcgt

Ku, P. (2018, September 19). *What are the most important project management skills?* Retrieved from https://bit.ly/3jzOLwS

Kwik, J. (n.d.). *Quotable quote*. Retrieved from https://bit.ly/40kJ4az

Martin, J. (2022, July 29). *The 25 project management skills you need to succeed.* Retrieved from https://bit.ly/3KE6WR7

Mizell, H. (2010). *Why professional development matters.* Retrieved from https://bit.ly/3TLPddc

Moira, A. (2019, February 19). *Project management guide: Tips, strategies, best practices.* Retrieved from https://bit.ly/3mjU1W1

Monica, W. (2014, July 18). *Top 10 characteristics of a great project manager.* Retrieved from https://bit.ly/2ZBoF3M

Morton, M. (2017, August 15). *5 Project management steps: process group project management.* Retrieved from https://bit.ly/40ND0aI

Number 8. (2019, December 10). *8 Traits of a skilled project manager.* Retrieved from https://bit.ly/2FrviyA

PM Tips. (2019, January 30). *11 Characteristics of a project manager*. Retrieved from https://bit.ly/35uXTxE

Prodigy. (2019, April 24). *5 Ways to make teacher professional development effective [with examples]* Retrieved from https://bit.ly/43cufsg

Project Management Institute. (n.d.). *What is project management?* Retrieved from https://bit.ly/3sa4lUd

Reddy, S. (2018, June 12). *10 Characteristics of a good project manager*. Retrieved from https://rb.gy/63ui06

Reh, F. J. (2019, September 4). *How to successfully manage your first project.* Retrieved from https://bit.ly/2QWROnu

Rob, W. (2016, October 18). *18 Ways to improve your project management skills as a small business owner*. Retrieved from https://bit.ly/417s2N9

Rovinelli, R. J., & Hambleton, R. K. (1977). On the use of content specialists in the assessment of criterion-referenced test item validity. *Dutch Journal of Educational Research*, *2,* 49-60.

Salapatas, J. N. (2000). *Best practices—the nine elements to success*. Paper presented at Project Management Institute Annual Seminars & Symposium, Houston, TX. Newtown Square, PA: Project Management Institute. Retrieved from https://bit.ly/3lUSK7h

Sanrattana, W. (2018). *Research in educational administration: Concepts, practices and case studies* (4th ed.). Thiphawisut.

Singh, R. (n.d.). *6 Traits that every successful project manager must possess.* Retrieved from https://rb.gy/tfslhg

Talent Garden. (2021, June 5). *Project management as a skill: Why is it so important?* Retrieved from https://bit.ly/37tXyuV

Tamara, M. (2020, September 2). *The top three skills every successful project manager needs to focus on*. Retrieved from https://bit.ly/3hw8Scz

Teamwork. (n.d.). *Why is project management important?* Retrieved from https://bit.ly/3AmvO82

The Indeed Editorial Team. (2022, November 9). *What is self-learning? (And benefits and tips for improving).* Retrieved from https://uk.indeed.com/career-advice/career-development/self-learning

The Mind Tools Content Team (n.d.b). *How good are your project management skills.* Retrieved from https://bit.ly/3UgW8LY

The Mind Tools Content Team. (n.d.a). *What is project management*? Retrieved from https://bit.ly/3jsP5xJ

Thinking Portfolio. (2018, August 1). *6 Characteristics of an effective project management officer.* Retrieved from https://bit.ly/3kt0qgb

Thompson, S. (2022, December 26). *Top 5 advantages and disadvantages of online classes for higher education.* Retrieved from https://bit.ly/3zafEjh

TUIO staff. (2022, December 14). *8 Tips for effective teacher professional development*. Retrieved from https://bit.ly/40qcfsU

Tyler, R. (2017, July 26). *10 Characteristics of a good project manager.* Retrieved from https://bit.ly/2H35z01

UCLA: Statistical Consulting Group. (August 22, 2016). *What does Cronbach's alpha mean?* Retrieved from https://bit.ly/3O1ySxK

Valchev, M. (n.d.). *Project management skills.* Retrieved from https://bit.ly/3fAda4m

Villanovau University. (n.d.). *Five essential project management skills.* Retrieved from https://bit.ly/3mk0S1U

Yamkasikorn, M. (2008). How to use efficiency criterion in media research and development: The Difference between 90/90 Standard and E1/E2. *Education Journal Burapha University, 19*(1), 1-16.

Yılmaz, D., & Kılıçoğlu, G. (2013). Resistance to change and ways of reducing resistance in educational organizations. *European Journal of Research on Education, 1*(1), 14-21. Retrieved from https://bit.ly/2PoxaJ5

Copyrights