Empowering Teachers' Learning to Foster Innovative Work Behaviors of Students

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Abstract

This research aims to conduct research using the Research and Development (R&D) methodology to obtain an educational innovation called "online self-training program for empowering teachers' learning to foster innovative work behaviors of students" that is effective and can be applied in schools serving as the target population in disseminating research results widely. This online self-training program consists of 2 projects: 1) a teacher development project with seven self-training modules for teacher learning and 2) a teacher project that uses teachers' learning outcomes to develop students, which contains one self-training module to be used as a practice guide for teachers. The results of the experimental research in the first project found that the 14 teachers' post-test scores in the experimental group were in line with the standard criteria of 90/90 and were significantly higher than the scores from the pre-test. Moreover, the results of the experimental research in the second project found that 121 students who were the target group affected by the development had significantly higher scores from the post-test than the pre-test. Since the research results follow the specified research hypotheses, it shows that the educational innovations as the products of this research are of quality and can be disseminated for further use by teachers and students in schools that are the target population.

Keywords: online self-training program, teachers' learning, innovative work behaviors

1. Introduction

From studying the relevant literature, it was found that there are various and interesting views on the nature, importance, and benefits of Innovative work behavior. For example, Nehles et al (2017) expressed the view that innovative work behavior is all individual actions directed at the generation, processing and application/implementation of new ideas regarding ways of doing things, including new product ideas, technologies, procedures or work processes to increase the organizational effectiveness and success. While Choi et al (2021) opined that innovative work behavior leads to organizational innovation and is related to organizational performance. When the organization supports innovation, employees become more interested in innovation, which becomes the basis for innovative behavior. Another person, Srirahayu et al (2023), holds the view that innovative work behavior is expected. to produce innovative and therefore beneficial outcomes for individuals, groups, or organizations. These innovative outputs can range from the expansion and renewal of products, services, procedures, and processes to the evolution of new production methods and management systems.

In addition, there are many suggestions for developing innovative work behavior that are diverse and interesting as well. For instance, Shah et al (2022) mentioned the five stages: opportunity exploration, idea generation, idea promotion, idea realization, and reflection. Acton (2021) has proposed 10 ways to create innovations at work as follows: 1) start conducting stand-up meetings; 2) surround yourself with inspiration; 3) get a buddy; 4) pick small projects; 5) flip your assumptions; 6) bring it to life; 7) ban things; 8) get out of the office; 9) fuel up on creativity; and ask yourself “What would my hero do?”

The above shows the importance of innovative work behaviors in an innovative society both at present and in the future. Plus, it demonstrates the proposal of different ways to promote innovative work behaviors, especially when searching

for information on the Internet where different views of knowledgeable people from various regions of the world on many issues can be found such as definitions, importance, characteristics, development guidelines, development steps, obstacles, and challenges in development as well as evaluation guidelines.

As there are various views on innovative work behaviors mentioned above, the researchers perceive these as a valuable body of knowledge that can be used as a guideline for promoting innovative work behaviors for teachers and students in secondary schools under the Office of the Basic Education Commission in Thailand. Therefore, the research team used the Research and Development (R&D) methodology to produce what are considered educational innovations developed upon the concept that "knowledge and action is power" by bringing together various perspectives on innovative work behaviors in various issues to be implemented as a guideline for teacher development to allow teachers to learn first. Then, teachers will be stimulated and encouraged to apply the learning outcomes to student development. This is an educational innovation called an "online self-training program for empowering teachers' learning to foster innovative work behaviors of students." The research team believes that an R&D methodology with principles, concepts, and operating procedures as discussed in the research methodology section later will result in an effective educational innovation as expected. This can be distributed to benefit teachers and students in secondary schools under the Office of the Basic Education Commission, which is the target population for disseminating the outcomes of this research throughout the country. This is expected to go in line with the R&D principles in which any innovation is researched and developed based on experiments in the areas that are chosen as representatives of the population. Once the results of the experiment show that the innovation is effective according to the specified criteria, it can be disseminated to benefit the target population in the research.

1.1 The Purpose of Research

This research aims to employ an R&D methodology to obtain an educational innovation called an "online self-training program for empowering teachers' learning to foster innovative work behaviors of students" that is effective according to the criteria and can be shared with teachers and students in secondary schools under the Office of the Basic Education Commission, that serves as the target population for disseminating the results of this research throughout the country. This online self–training program consists of 2 projects: 1) a teacher development project and 2) a student development project based on the learning outcomes of the teachers.

1.2 Research Hypothesis

From studying several research studies aiming to develop educational innovations with the concept of "Starting with Developing Teachers' Learning and Then Applying it in the Classroom." and "Knowledge and Action is Power", it was found that the results from these studies are under the research hypotheses. For example, the research entitled "Empowering Teachers' Learning to Develop Innovative Skills for Students" by Hatsanmuang and Sanrattana (2023), “Developing Teachers to Enhance Students' Effective Teamwork Skills” by Saysin and Dhammapissamai (2023) and “Empowering Teachers' Learning to Develop Students' Inspirational Skills” by Kromthamma and Supakicco (2023). Therefore, it is believed that the research “Online Self-Training Program for Empowering Teachers' Learning to Strengthen Students' Teamwork Skills” will be effective as well. Therefore, the research hypotheses for each project are set as follows:

- According to experimental research in the first project, it is hypothesized that teachers’ post-test scores in the experimental group meet the standard criteria, which is 90/90, and are significantly higher than their pre-test scores.
- The experimental research results in the second project hypothesize that students who are the target group affected by the development would have significantly higher scores from the post-test than the pre-test.

1.3 Literature Review

The research team studied literature related to innovative work behaviors with a wider range of issues than what was initially studied. The aim is to gain knowledge that will be used to create self-training modules for teachers to learn in 7 areas as follows: 1. The definition from the perspectives of Ahmad (2019), All Answers Ltd. (2018), De Jong and Den Hartog (2019), De Spiegelaere et al. (2014), Messmann (2012), Oukes (2010), and Zainal and Effendi (2020). 2. The importance from the perspectives of Abdullah (2020), Ahmad (2019), Tayyaba et al. (2016), and Zainal and Effendi (2020). 3. The characteristics from the perspectives of Bagley (2014), Day (n.d.), Hassi (2019), Newquist (2015), Oukes (2010), and Patel (2018). 4. The obstacles and ways to overcome them from the perspectives of Connor (2020), Maer (n.d.), Sieczka (2011), and Tracy (2016). 5. The development guidelines from the perspectives of Carlstrom (2020), Davis (2018), Edsys (2017), Fedena (2019), Gatty (n.d.), Gayan (2021), Getsmarter (2020), Green (2021), Guest Author (2018), Jandhyala (2017), Livescault (n.d.), Markham (2013), Mike Sharkey (n.d.), Robert Half International (n.d.), Seechaliao (2017), and Shulman (2018). 6. The stages of development from the perspectives of

Björling (2018), Boutelle (n. d.), Hattendorf (2014), Ludema and Johnson (2019), Molloy (2019), and Walkowiak (n.d.). 7. The evaluation from the perspectives of Beest (n.d.), De Jong and Den Hartog (2019), Kamp (n.d.), Messmann (2012), and Samson (2020).

The study results on the seven issues mentioned show that views regarding "development guidelines" are important as these are suggestions demonstrating "principles, concepts, techniques, methods, and activities" for teachers to acquire first so that teachers can use the learning outcomes as guidelines to continuously develop their students. Because of this, the research team synthesized the issues related to "development guidelines" from the viewpoints of various reference sources as mentioned above, there are 63 approaches as follows: 1) become an attentive listener. 2) encourage new skills, 3) set an example, 4) embrace technology, 5) welcome new ideas, 6) teach concepts, not facts, 7) personalize learning, 8) teach through smart boards, 9) use project-based learning: PBL, 10) ask open-ended questions, 11) do not make staff jump through hoops, 12) work together as a team, 13) participate in an innovation hub, 14) identify the issues to work on, 15) arrange classes outside the classroom, 16) consider a flipped classroom model, 17) create flexible learning environments, 18) model and promote fearless behavior, 19) adopt a non-hierarchical management approach, 20) teach through virtual reality, 21) foster a question-friendly environment, 22) organize a rethink competition, 23) use a design-thinking process, 24) learn by research, 25) use tools to create time and space to innovate, 26) create a compassionate, accepting environment, 27) model creativity in the classroom, 28) use questioning techniques that challenge creative thinking, 29) empower your employees to think about tough problems, 30) empower your employees to make decisions and act, 31) give your staff a reason to care, 32) experiment with activities where students can practice creative thinking, 33) develop an innovation strategy - and use it, 34) brainstorm ideas for innovation, 35) judge the ideas, 36) empower ideas to be executed, 37) encourage your people to think about innovation daily, 38) accept failure and make it the norm, 39) ensure staff psychological safety, 40) develop your students' creativity in the classroom, 41) do what you can to remove the red tape, 42) consider continual improvement one of the company's core values, 43) refer to books on creativity, 44) have a stimulating classroom environment, 45) recognize and reward successful innovations, 46) find and motivate intrapreneurs, 47) embrace co-creation and open innovation opportunities, 48) employ technology and innovative methods of teaching, 49) inspire people to voice their opinions, 50) use a jigsaw method, 51) foster innovation in the workplace by rewarding innovative ideas, 52) build market knowledge, 53) be reminded that true innovation takes commitment and perseverance, 54) employ creative teaching, 55) make preventing burnout a top priority, 56) organize your office for maximum innovation, 57) ease up, and move into a new space, 58) think about a new hobby, 59) build market knowledge and look for market adjacencies, 60) use a problem-finding method, 61) encourage autonomy, 62) picking up small projects, and 63) work with innovators.

2. Research Methodology

2.1 Concepts and Process

This research uses the Research and Development (R&D) methodology according to Sanrattana (2023) who stated that educational innovations developed using this research method are intended to be used to develop people to gain knowledge. It is expected that those with knowledge will put that knowledge into action which will create power for effective work as the saying goes, "knowledge and action are power." This statement has led to the idea of this research that "starts with development for teachers' learning" and then lets the teachers use the learning outcomes to continue developing the students." The research was carried out in 4 steps as follows:

Step 1 Review literature related to innovative work behavior to obtain information needed for creating 7 online self-training modules for teachers' learning: 1) definitions 2) importance 3) characteristics 4) obstacles and how to overcome them 5) development guidelines (principles/concepts/techniques/methods/activities) 6) steps for development 7) evaluation.

Step 2 Check the quality of online self-training modules created by organizing 2-phase focus group discussions. **Phase 1** is about preliminary field testing and revision by 5 teachers in schools that were not used in one of the experimental research areas. **Phase 2** dealt with main field testing and revision by 10 teachers in another school that was not in the experimental research areas.

Step 3 Create two sets of tools for use in experimental research: 1) a teacher learning outcome test and 2) a student innovative work behavior assessment form (details will be discussed in the research tools section).

Step 4 Test the effectiveness of the online self-training program according to the research hypothesis by taking the Online Self-Training Program for Empowering Teachers' Learning to Foster Work Behaviors of Students to conduct

experimental research in the form of one group pretest-posttest in a school that was randomly selected as research areas. There was an experimental group of 14 teachers and 121 students in the second semester of the 2023 academic year. The research was divided into 2 phases as follows: 1) experimental research of a 1-month development project for teacher learning and 2) 2-month experimental research applying learning outcomes from the teacher development project to student development.

2.2 Research Tools

2.2.1 Teacher learning results test which was a 4-choice format intended to be used to test the learning outcomes of teachers before and after the experimental research in the development project for teacher learning

The researchers created the content based on 6 aspects: definition, importance, characteristics, development guidelines, development steps, and assessment. Each aspect is tested according to the cognitive domain, arranged from lower thinking skills to higher thinking skills, namely remembering, understanding, applying, analyzing, evaluating, and creating according to the revised Taxonomy 2001 by Benjamin S. Bloom (Armstrong, 2010). This test has been subjected to two phases of quality check as follows:

The first phase *Inspects content validity* using the method of Rovinelli and Hambleton (1977) called Indexes of Item-Objective Congruence (IOC). In this phase, 5 experts in the field of curriculum and instruction as well as educational measurement and evaluation took part. According to the analysis results, it was found that every question item had an IOC value above the 0.50 threshold (Chaichanawirote & Vantum, 2017). **Second phase** *Inspect Quality* This was conducted by piloting the test with a sample of 30 teachers in schools that were not in one of the experimental areas. The results showed that 1) every test item has an index of difficulty according to the criteria, which is between 0.20 - 0.80, and has a power of discrimination according to the criteria, which is from 0.20-1.00 2) the KR-20 value that represents the confidence coefficient is equal to 0.74 which is higher than the threshold of 0.70 and 3) the difficulty of the test is equal to 0.63

2.2.2 Evaluation form of students' innovative work behaviors that has a rating scale of 5 levels: highest, high, moderate, low, and the lowest

The research team developed an assessment form on the results of a characteristic study that demonstrated innovative work behavior from the perspective of Bagley (2014), Day (n.d.), Hassi (2019), Newquist (2015), Oukes (2010), Patel (2018) as well as from the results of the study of assessment concepts regarding innovative work behavior from the point of view of Beest (n.d.), De Jong and Den Hartog (2019), Kamp (n.d.), Messmann (2012), and Samson (2020). This assessment form was subjected to two phases of quality check as follows:

First phase *Check content validity* using the method of Rovinelli and Hambleton by the 5 experts in the field of educational administration and educational measurement and evaluation. It was found that all question items have an IOC value higher than the 0.50 threshold, indicating that the questions in this evaluation can be applied to the objectives that are being measured (Chaichanawirote & Vantum, 2017).

Second phase *Check reliability or internal consistency* by piloting the assessment form with a sample group of 30 students in a school that was not the area of the experiment to analyze the alpha coefficient of reliability using Cronbach's method. According to the analysis results, the alpha coefficient of reliability of the entire assessment form was equal to 0.73 When analyzed by aspect, it was found that creativity, intrinsic motivation, proactive behavior, proactive behavior, freedom of work, self-reliance, and risk acceptance had a value equal 0.71, 0.76, 0.79, 0.70, 0.70 and 0.71 respectively. When comparing the reliability coefficient with the specified criteria, which is equal to or higher than 0.70 (UCLA: Statistical Consulting Group, 2016), it showed that the values were higher than the specified threshold, indicating that the items have relatively high internal consistency.

2.3 Data Analysis

The collected data were analyzed in 2 aspects: 1) analysis of scores from the post-experiment test of teachers' learning outcomes compared with the standard 90/90; the first 90 refers to the percentage of the average score of the entire group of teachers obtained from the test while the latter means the percentage of the number of teachers who passed the test according to all objective criteria (Yamkasikorn, 2008) 2) analysis to compare the results between pre-test and post-test using t-test dependent as a statistical tool.

3. Results

3.1 Results That Serve as an Educational Innovation

The results of this research resulted in an educational innovation called Online Self-Training Program for Empowering Teachers' Learning to Foster Innovative Work Behaviors of Students that consists of two projects carried out consecutively: *Teacher Development Project*, using 7 self-training modules for teachers' learning about innovative work behaviors as follows: 1) definition, 2) importance, 3) characteristics, 4) obstacles and ways to overcome them, 5) development guidelines, 6) development stage, and 7) evaluation. *The Project of Student Development is based on Teachers' Learning Outcomes,* with 1 self-training module to be used as a guideline for teachers' practice. It consists of the following issues: 1) instruction, 2) summarize the expected characteristics, 3) summary of development guidelines, 4) summary of the development process, 5) students' innovative working behaviors assessment form, 6) self-assessment form for teachers on the level of implementation of development guidelines (google form), 7) teachers' self-assessment on the selection of a development process model for implementation (google form), and 8) teacher's self-reflection form on practice (google form). The characteristics of this program are illustrated as follows.

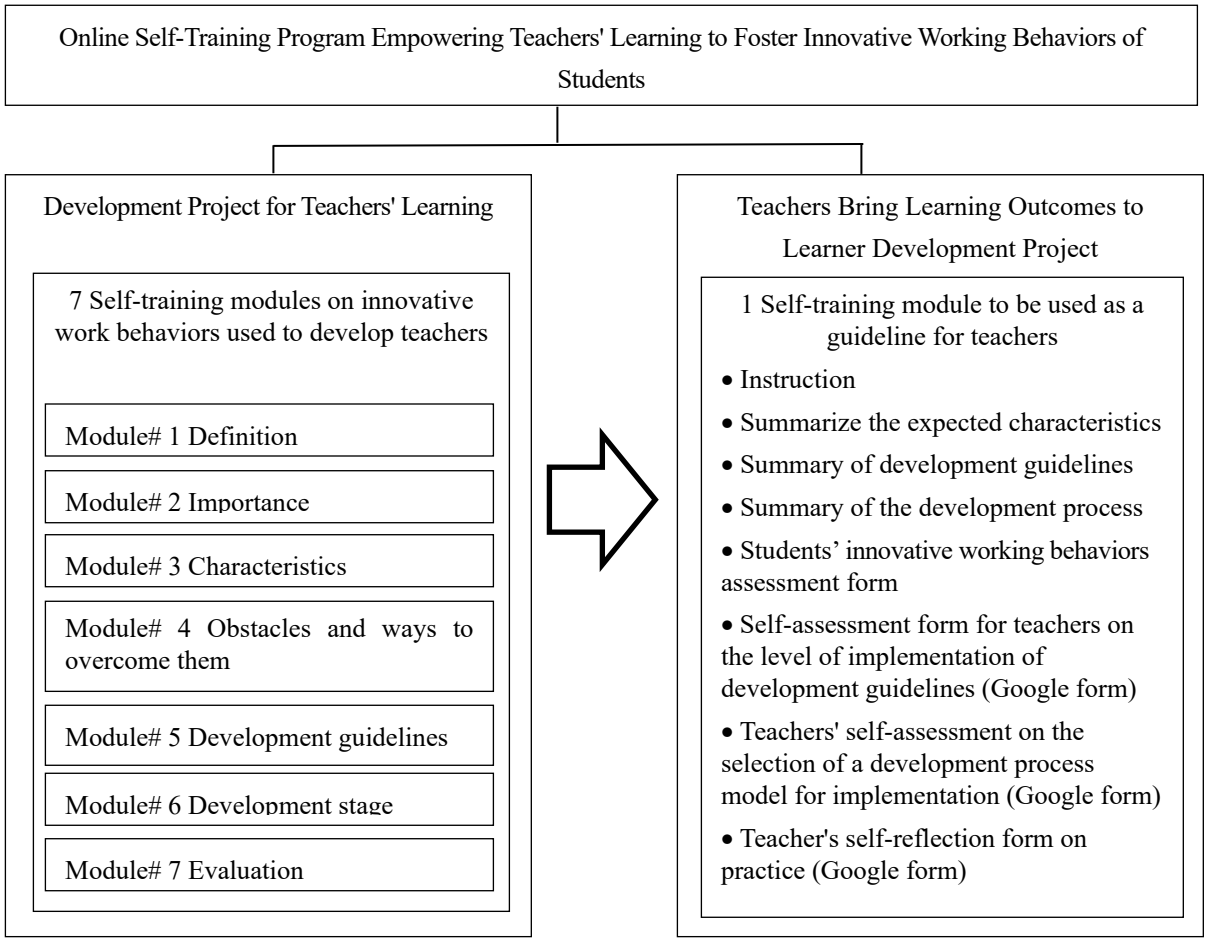

Figure 1. Online Self-Training Program for Empowering Teachers' Learning to Foster Innovative Work Behaviors of Students (see the characteristics of the program in the original Thai language from https://shorturl.at/muCST).

3.2 Results of Testing the Effectiveness of the Online Self-Training Program

Results of experimental research in the project for teacher learning development were found to following the research hypotheses: 1) Teachers in the experimental group had average scores of 32.93 from the post-test, accounting for 91.47 percent of the full score and their learning outcomes passed all objectives specified with 100 in percentage which meets the standard criteria of 90/90 2) Teachers had a higher mean score from the post-test than the pre-test, with statistical significance at the 0.05 level, as shown in the results of data analysis in Table 1.

Table 1. Mean of Teachers' Pre-test and Post-test Scores Using Dependent t-test

Testing	Sample size	Mean	Standard Deviation	t
Pre-test	14	21.29	2.95	20.77*
Post-test	14	32.93	1.49	

* $p < 0.05$

3.2.1 Results of experimental research in the development project of applying teachers' learning outcomes to the learner development project

The results were according to the set hypotheses, as seen in the analysis results of the means and standard deviations computed upon the innovative work behavior evaluation of students before and after the experiment, which are shown in Table 2, and the results of the comparative analysis using the dependent t-test are shown in Table 3.

Table 2. Means and Standard Deviations Computed Upon the Innovative Work Behavior Assessment of Students Before and After the Experiment

Characteristics indicating innovative work behaviors of students	Assessment results			
	Pre-test		Post-test	
	$\bar{\chi}$	S.D.	$\bar{\chi}$	S.D.
Creativity	**2.74**	**0.21**	**3.77**	**0.20**
• I am a person who likes to think that work can get better.	3.17	0.72	4.16	0.41
• I am a person who finds complex problems challenging.	2.59	0.49	3.67	0.54
• I am a person who is good at finding solutions to existing problems.	2.39	0.49	3.64	0.51
• I am a person who can connect new ideas with existing ideas.	2.45	0.50	3.69	0.50
• I am a person who likes the challenge of developing new works according to my passion.	2.66	0.48	3.57	0.50
• I am a person who likes to wonder how I can improve my work.	2.65	0.48	3.72	0.45
• I am a person who likes to find new ways of working, techniques, or tools to improve my work.	2.76	0.56	3.79	0.45
• I am a person who likes to find new ways to work.	2.85	0.48	3.77	0.50
• I am a person who likes to look for opportunities to improve things.	2.85	0.44	3.83	0.45
• I am a person who likes to create new ideas which are different from traditional ones.	2.97	0.48	3.85	0.54
Intrinsic motivation	**2.95**	**0.32**	**4.05**	**0.36**
• I am a person who sees my work as a challenge.	2.83	0.70	4.05	0.77
• I am an advocate for friends with creative minds.	3.47	0.50	4.61	0.69
• I am a person who strives to influence others to value innovation.	2.95	0.64	4.19	0.67
• I am a person who likes to exchange ideas about work development with friends.	3.06	0.70	4.26	0.72
• I am a person who likes to ask important questions.	2.62	0.49	3.70	0.64
• I am the person who encourages group members to take initiative.	2.74	0.57	3.79	0.55
• I am a person who likes to promote new ideas to my friends to gain support in my work.	3.01	0.56	3.90	0.65
• I am a person who likes to convince others of the importance of new ideas or solutions.	2.84	0.47	3.91	0.55
Proactive behavior	**2.92**	**0.24**	**3.80**	**0.37**
• I am a self-improving and action-oriented person.	2.98	0.62	3.77	0.69
• I am a person with an insatiable curiosity.	2.88	0.46	3.71	0.49
• I am a person who wants to be competitive.	3.39	0.64	4.23	0.56

Characteristics indicating innovative work behaviors of students	Assessment results			
	Pre-test		Post-test	
	$\bar{\chi}$	S.D.	$\bar{\chi}$	S.D.
• I am a person who strives to develop new things.	2.87	0.52	3.86	0.54
• I am a person who likes to find new ways to operate.	2.80	0.46	3.62	0.64
• I am a person who asks other people's opinions when inventing new things.	3.08	0.57	3.85	0.48
• I am a person who knows progress in my practice, which allows me to explore new opportunities.	2.65	0.54	3.76	0.63
• I am a person who likes to use creativity in my work systematically.	2.80	0.51	3.83	0.68
• I am a person who likes to set success criteria to generate new ideas.	2.79	0.41	3.55	0.59
Freedom of work	**2.83**	**0.31**	**3.79**	**0.31**
• I am an open person who accepts new things as part of my job responsibilities.	3.18	0.50	4.05	0.38
• I am a person who thinks there is enough time to think of new things.	2.50	0.50	3.68	0.61
• I am a person who is recognized for my creativity and new ideas.	2.97	0.46	3.83	0.64
• I am a person who likes to express my opinions.	2.66	0.48	3.60	0.52
Self-reliance	**2.88**	**0.30**	**3.76**	**0.32**
• I am a person who thinks that I am good at my various tasks.	2.94	0.50	4.05	0.60
• I am a person who can complete assigned tasks on time.	3.17	0.58	3.69	0.62
• I am a person who likes to explore new ideas/insights in my interests.	2.66	0.69	3.70	0.60
• I am a person who likes to learn about new developments both in the classroom and outside the classroom.	2.77	0.50	3.60	0.52
Risk acceptance	**3.00**	**0.26**	**3.94**	**0.26**
• I am a person who is ready to take risks with my work.	2.66	0.48	3.64	0.48
• I am a person who likes a challenge, even if it means risking failure.	2.95	0.48	3.75	0.55
• I am a person who takes risks to create innovations.	3.09	0.53	3.88	0.45
• I am a person who likes to feel that not every work I take part in is a success.	3.56	0.50	4.31	0.55
• I am a person who likes to analyze solutions regarding adverse effects to put ideas into practice.	2.74	0.75	4.11	0.63
Total	**2.87**	**0.18**	**3.85**	**0.22**

From Table 2, it can be seen that the average scores from the innovative work behavior assessment of students after the experiment were higher than before the experiment, that is, the average score after the experiment was 3.85 (standard deviation was 0.22). the average score before the experiment was 2.87 (standard deviation was 0.18). When comparative analysis was performed with a dependent t-test, it was found that there was a statistically significant difference at the 0.05 level as shown in Table 3.

Table 3. The Results of Data Analysis Comparing the Mean Scores of the Pre-test and Post-test of the Students Using a Dependent t-test

Evaluating	Sample size	Mean	Standard Deviation	t
Pre-test	121	2.87	0.18	48.18*
Post-test	121	3.85	0.22	

* $p < 0.05$

4. Discussion and Conclusion

Results from research conducted using R&D methodology, with the final step being experimental research in the form of a one-group pre-test and post-test, were obtained from schools that had been randomly selected as the research scope. The experimental group comprised 14 teachers, and the target group impacted by the development

consisted of 121 students. The aim was to assess the effectiveness of the "Online Self-Training Program for Empowering Teachers' Learning to Foster Innovative Work Behaviors in Students," which was regarded as the educational innovation expected to be derived from this research. It was discovered that this educational innovation had been effective by the established research hypotheses, both in the context of the experimental research within the development project for teacher learning and in the context of experimental research within the project, in which the teachers implemented the learning outcomes with their students. The teachers in the experimental group achieved post-test scores that met the standard criteria of 90/90, which significantly surpassed their pre-test scores. Likewise, the students in the target group, who had been affected by the development, exhibited significantly higher scores on the post-test compared to the pre-test. The findings of this research aligned with those of others, who had employed similar research designs, such as "Empowering Teachers' Learning to Develop Innovative Skills for Students" by Hatsanmuang and Sanrattana (2023), "Developing Teachers to Enhance Students' Effective Teamwork Skills" by Saysin and Dhammapissamai (2023), and "Empowering Teachers' Learning to Develop Students' Inspirational Skills" by Kromthamma and Supakicco (2023). These studies demonstrated that the concepts of "Starting with Developing Teachers' Learning and Then Applying it in the Classroom." and "Knowledge and Action is Power", which were employed in this research method, including the online self-training program that consists of two projects carried out consecutively: *Teacher Development Project*, using 7 self-training modules for teachers' learning about innovative work behaviors and The *Project of Student Development is based on Teachers' Learning Outcomes*, with 1 self-training module to be used as a guideline for teachers' practice, had yielded the effective educational innovations that had been anticipated. These findings suggested that the outcomes can be disseminated and applied in other schools with a broader target audience.

Aside from evaluating the effectiveness of the educational innovations, which had been created as the primary objective, the research team also aimed at acquiring additional insights from the teachers in the experimental group while conducting the research. Specifically, they sought knowledge that encompassed learning and reflections that had been derived from actual practice in the field. Several noteworthy points, which were gleaned from these discussions, are elaborated below:

Barriers to fostering innovative work behaviors among students stem from the organizational and individual contexts, in which there is the persistence of fixed mindsets rather than the act of embracing growth mindsets. This aligns with Connor (2020), who noted that barriers originate from the work environment, entrenched (negative) habits, attachments to particular mindsets and worldviews, and a fixed mindset or fear of failure. This perspective aligns with the views of Sieczka (2011) who stated: "Most organizations have barriers to creativity, ideas, and innovation. Some are obvious, while some are more subtle. Some barriers emerge from attitudes and perceptions of organizational leadership, while others come from organizational structure or even from the employees themselves. Since these barriers tend to eliminate creative possibilities from the organization, identifying and removing barriers to creativity and innovation is crucial. By pinpointing, recognizing, and acknowledging that barriers exist, an organization can bypass many common obstacles and become more idea-oriented by employing simple strategies."

Numerous obstacles hinder the enhancement of innovative work behaviors. A synthesis of perspectives from Connor (2020), Maer (n.d.), Sieczka (2011), and Tracy (2016) is summarized as follows: 1. On the Individual Level, there can be a lack of clear goals and objectives, motivation or inspiration to work, and a lack of recognition for innovative efforts. Moreover, there can be a resistance to creativity and new processes, fear of expressing new thoughts or ideas different from what has been done before, apprehension about being ridiculed or criticized, and fear of failure, as well as lack of dedication of time or effort to creativity, the absence of channels for presenting ideas and sharing knowledge, deficiencies in knowledge and development skills for creating innovations, a lack of creative thinking for sustained success, and the possession of fixed attitudes, points of view, and values. 2. On the Organizational Level, there can be a lack of collaborative goals or objectives, insufficient empowerment of individuals to drive innovation strategies, an absence of rewards for innovators, limited budgets, and inflexible and rigid policies and procedures, as well as work environments or work cultures that are not conducive to creating innovations.

Concerning Maer's (n.d.) perspective, the guidelines for overcoming barriers in developing innovative work behaviors, are as follows: make people part of the change, rally support with purpose-driven stories, empower the middle managers, reward innovations, get untangled from the jargon, and embrace constraints.

According to academic principles, it has been acknowledged that the process of developing innovative work behaviors faces numerous obstacles. However, this research revealed that the "Online Self-Training Program for Empowering Teachers' Learning," which was designed to foster innovative work behaviors in students using R&D methodology, was proven to be effective. Both in the case of the teachers' learning and the case, in which the

teachers' learning outcomes were utilized to develop students, these findings can be applied in schools serving as the target population, which will allow the research results to be broadly disseminated.

5. Recommendations

It is the opinion of the research team that to foster inspiration for effective and efficient practice, teachers should be encouraged to recognize the significance of innovative work behaviors for current and future students entering the labor market in various organizations as the research team has synthesized recommendations from the views of Abdullah (2020), Ahmad (2015), Tayyaba et al (2016), and Zainal & Effendi (2020) were as follows: 1) it is a behavior that encompasses creativity and innovation, is essential for nearly every type of work, and influences success at both individual and organizational levels; 2) it is a strategy that is employed to overcome and address challenges that are associated with job demands; 3) it is a strategy for addressing challenges in inventing and implementing new and useful ideas at work; 4) it forms the foundation for driving change and fostering innovations within organizations; 5) it involves the process of enhancing the current state or creating new solutions for both the organization and one's self; 6) it involves adapting to the uncertainties of the current environment and technological developments; 7) it involves fostering innovation to enhance competitiveness; 8) it offers an organization a sustainable competitive advantage that is crucial for its long-term success and survival; 9) it contributes to enhancing the efficiency of management; and 10) it enhances organizational efficiency and success.

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Authors contributions

Watthikorn Phochaito was responsible for all stages of research operations, from defining research issues, determining research methods, studying relevant literature, developing learning modules for use in the program, conducting field research, summarizing and reporting research results. Associate Professor Dr. Wirot Sanrattana and Assistant Professor Dr. Phrasrivajiravati were responsible for providing advice and consultation in the research process. Watthikorn Phochaito drafted the manuscript and revised it. Associate Professor Dr. Wirot Sanrattana and Assistant Professor Dr. Phrasrivajiravati approved the final manuscript.

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