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# An Online Program to Develop Teachers to Enhance the Innovation Skills of Students

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## Abstract

This research focused upon the development of “An Online Program to Develop Teachers to Enhance the Innovation Skills of Students” by gathering teacher learning manuals and a practice manual for teachers to assist in developing students. Moreover, this study adopted the Research and Development (R&D) methodology. As a result of the implementation of R1&D1 to R4&D4, 6 sets of teacher learning manuals and 1 practice manual could be compiled. Additionally, the study employed a one group pre-test/post-test experimental paradigm. Based on the discovered outcomes from employing the manuals in the R5&D5 stage with 11 teachers and 204 students in a school that had been randomly chosen to represent the Division of Buddhist Studies of the National Buddhism Office, it was determined that the research findings had been consistent with the assumptions that had been made. The results demonstrated that the developed online program had been effective given that the post-developmental test for teachers had met the standard of 90/90, and the mean scores had been statistically significantly higher than prior to the development. Moreover, regarding the innovation skills assessment after the development, the results of the students’ mean score had been statistically significantly higher than before. The results proved that the designed online program had been effective and that it could be distributed to the additional Prapariyattidhamma Schools so that they could receive benefits.

**Keywords:** 21st-Century Skills, Innovation Skills, Online Program, Self-Learning

## 1. Introduction

Teaching and learning in the 21<sup>st</sup> century require a unified vision for learning in order to ensure that students are successful in a world where there are constant changes and where the process of learning never stops. The 21<sup>st</sup>-century skills that learners should develop have been categorized into three areas: 1) learning & innovation skills, consisting of creativity and innovation, critical thinking & problem solving, communication, and collaboration; 2) information, media and technology skills, which are comprised of information literacy, media literacy, and ICT (information, communications, and technology) literacy; and 3) life and career skills, for which flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility are important aspects (Battelle for Kids, 2019).

Innovation skills are included in what are considered as ‘essential skills.’ In academic studies, innovation skills are usually accompanied by creative skills because innovation skills lead to the creation of new or different ideas

or methods. Innovation occurs when creative ideas and methods are applied in order to better products that have previously been created (JAE's Team, n.d.). Innovation and creativity have been highlighted as essential skills for the 21st century. This is especially true given that both skills can promote human potential by eliciting the positive aspects of the individual (Nakano & Wechsler, 2018). Innovation and creativity blossom into skills that will lead to success in all fields of development. In order to find suitable solutions, Problem Management requires innovation skills, which can help to develop any existing concepts, while also encouraging new ideas. People with innovative concepts can do their work with full confidence and are willing to take risks in order to achieve their goals (Henderson, 2018).

Vikas, The Concept School (n.d.) remarked on innovation in education by stating that it encourages students and teachers to carry out research, to explore, and to use all the tools to uncover something new. Innovation involves finding different ways to look at problems and to solve them. It also improves education because it compels students to engage in a higher level of thinking so that they can solve complex problems. Innovation does not just mean the use of technology or new inventions, even though these can contribute to innovation. Innovation involves a new way of thinking, and thereby helps students to develop their creativity and problem-solving skills. Furthermore, Northwest Missouri State University (2018) suggested that innovations in education encourage both teachers and students to explore, conduct research, and to use all the tools to uncover something new. It is concerned with a different way of looking at problems and solving them. The thought processes that go into it will help students to develop their creativity, as well as to hone their problem-solving skills.

Due to the significance of innovation skills in 21<sup>st</sup>-century society and the fact that teachers must focus on developing students' innovation skills in order for them to succeed in work and life, the research team was interested in developing the educational innovation called *"An Online Program to Develop Teachers to Enhance the Innovation Skills of Students."* Research and Development (R&D) methodology was used in this study based on the concept of *"Develop teacher, and teacher will (then) develop students."* R&D aims to produce innovations that can develop "people" so that the "work" can be developed (The teacher's work is to develop students.). According to Sanrattana (2018), this research methodology generates educational innovations that can help instructors to enhance the quality of their work more greatly. Recently, there have been numerous thoughts and theories about educational innovations, which have focused on the belief that instructors would use their learning outcomes (Knowledge) to enhance their learners (Action), and that this would lead to more beneficial work performance (Power). Concisely, it is based on the concept that *"Knowledge and Action are Power."*

## 2. Research Objective

The purpose of this research was to conduct research with Research and Development (R&D) methodology that would enable the establishment of an effective "An Online Program to Develop Teachers to Enhance the Innovation Skills of Students" in accordance with the specified criteria. The developed online program consisted of a teacher's learning development project and the utilization of teachers learning outcomes in the student developmental project. There were module-based learning manuals for self-learning, and a student development practice manual for the teachers.

## 3. Research Assumption

In order to compile materials for the manuals, the researcher studied the relevant literature from various perspectives. After that, the manuals were examined and improved to assure the validity of each of the research tools. The experiments were conducted in the target school under the principles of R&D methodology, which are believed to yield effective educational innovations. Therefore, the assumption of the study was that the created project, "An Online Program to Develop Teachers to Enhance Innovation Skills of Students," would be effective in accordance with the following specific criteria: 1) the post-development test for teachers would meet the standard of 90/90, and the mean score would be statistically significantly higher than before the development, and 2) the students' mean score on innovation skills assessment after the development would be statistically significantly higher than before the development.

## 4. Research Methodology

### 4.1. Concept and Processes

This study employed Research and Development (R&D) methodology based upon the concept of: “*Develop the teacher, and the teacher will develop students*” because R&D focuses upon the idea of generating the innovation that develops the “people” to develop the “work” (The Teacher’s work is to develop students). According to Sanrattana (2018), this research methodology results in the creation of educational innovations that can assist instructors to enhance the quality of their performance. Lately, a variety of thoughts and theories about educational innovations have been published, which highlight the belief that instructors will bring their learning outcomes (Knowledge) to enhance their learners (Action), which will lead to more beneficial work performance (Power). Briefly, it is based on the concept that “*Knowledge and Action are Power.*” In addition, conducting a literature review is a vital beginning for R&D because it brings the researcher knowledge about the topic of online program development. The developed online program consists of projects, learning manuals, and a practice manual. Therefore, the first stage of R&D in this study was conducting a literature review in the pattern of R1&D1...R2&D2...R3&D3...Ri&Di as described below:

**R1&D1: The Review of the Literature Related to Innovative Skills** When the literature related to innovation skills was reviewed, the following features were found definitions, significant aspects, qualifications, developmental guidelines, developmental processes, and assessments. The knowledge, which was obtained and compiled from the review, was used to create six manuals for teachers’ learning as follows: (1) the Definition of Innovation Skills, (2) the Significance of Innovation Skills, (3) the Qualifications of Innovation Skills, (4) the Developmental Guidelines of Innovation Skills, (5) the Developmental Processes of Innovation Skills, and (6) the Assessment of Innovation Skills. The data, which was collected from the literature review, was also utilized to compile a practice manual to apply the teacher’s learning outcomes for student development.

**R2&D2: Eliminating the Flaws: The First Step** To make the first revisions to improve the manual, it was checked for flaws. The aspects, which were examined, were conciseness, usefulness, appropriate language, and the presentation of appealing content. A Focus group discussion was conducted with 10 teachers in a non-experimental school known as Prapassornwittaya Wat Srinual School.

**R3&D3: Eliminating the Flaws: The Second Step** To make even further improvements to the manual, the manual was checked for flaws a second time, which included examining the manual for conciseness, usefulness, appropriate language, and for the presentation of appealing content. The focus group discussions were conducted in two non-experimental schools: Pali Demonstration Wat Khe-Udom School (7 teachers) and Wat Bhdissompan School (8 teachers).

**R4&D4: A Study of the Additional Literature** Additional literature on the topic of innovation skills assessment was explored to create two research tools: 1) the Teachers’ learning outcomes test, and 2) the student innovation skills assessment form.

**R5&D5: Examining the Manuals in the Pre-experimental Research Step with a one group Pre-test/Post-test design** The experimental area was the general education classes at the Pariyattidhamma Demonstration Pali School of Mahachulalongkornrajavidyalaya University, Wat Si Sa Ket (Grades 7-12), which is under the Division of Buddhist Studies National Buddhism Office. It is located in the Mueang District of Nong Khai Province. This study used purposive sampling to select the experimental group. The target consisted of 11 teachers and 204 students. The field experiment took place during the Second Semester of the Academic Year of 2021, and the experimental course was divided into two phases as described below:

**Phase 1: The Development of the Teachers’ learning using an online self-learning program** The activities and durations of this phase were as follows:

- 1) A meeting was conducted to explain the details of the information to the experimental group of teachers and to apply the teachers’ pre-test. This phase took two days.

- 2) The teachers' development began by using the online manuals and the self-learning modules, which could be downloaded from the website that the researchers had created. The requirement was that the learning had to be completed without intervention from the research team or from anyone else. This step took one month.
- 3) The target teacher group eliminated the mistakes in order to improve the manuals and took a post-test. This step took two days.
- 4) The researchers analyzed the post-test results and compared them using the standard criteria of 90/90. The researchers also made a comparative analysis of the average scores of the pre-test and the post-test using the t-test dependent. This step took two days.

**Phase 2: Applying the Teacher's learning outcomes to develop the students** The activities and durations of this phase are included the following steps:

- 1) The researchers met with the target teacher group to explain the research details and to evaluate the innovation skills of the students in the target group using the pre-test. This step took two days.
- 2) Without any intervention from the research team or from anyone else, the target teacher group implemented the learning outcomes to develop the students' innovation skills. This step took two months.
- 3) The target teacher group worked to find any and all errors so that the manuals could be improved and then evaluated the students' innovation skills using a post-test. This step took two days.
- 4) A comparative analysis of the average scores of the pre-test and the post-test was completed using a t-test dependent. This step took two days.

#### 4.2. Research Tools

**1. The Teacher's Learning Outcomes Test** was a set of multiple-choice questions with four answers. The purpose of the test was to evaluate the teachers' knowledge in the pre-experimental and post-experimental stages. The test was an online form (Google Form) and was written using the content from the teacher's learning manuals. Its details were comprised of the following: definitions, significant aspects, characteristics, developmental guidelines, developmental processes, and an assessment of the innovative skills. The cognitive domain of the test was drawn from Benjamin S. Bloom's concept, which ranks thinking skills from low to high as follows: remembering, understanding, applying, analyzing, evaluating, and creating (Armstrong, 2010). After that, the test was examined for validity as outlined in the following steps.

- 1.1 The test validity was scrutinized by five experts in the fields of curriculum, teaching, and measurement using Rovinelli and Hambleton's (1977) Indices of Item-Objective Congruence (IOC). The results indicated that every question had had an IOC value of higher than 0.50 (Chaichanawirote & Vantum, 2017).
- 1.2 The trial of the test was applied with 30 teachers at three non-experimental schools (Ban Bon Wittaya School, PhraPariyattidhamma School Wat Amphawan, and Wat Phrathat Witthaya School). The analysis of the results of the test trial showed the following: 1) the index of difficulty of questions had been between 0.20 - 0.80, and the power of discrimination had been between 0.20-1.00, which conformed to the specified criterion; 2) the reliability of the test had a KR-20 coefficient of 0.95, which was greater than the specified criterion (equal to or greater than 0.70); and 3) the difficulty of the test was determined to be 45.83, which is considered to be an appropriate level of difficulty.

**2. The Student's Innovative Skills Self-Assessment Form** The form used a 5-level rating scale: the most, very, medium, less, and the least. The researcher created the form, which was based on studies related to the characteristics of innovation skills from the perspectives of Inusual (2018), Premuzic (2013), and Zenger (2015), and on studies based on innovation skills assessment from Bukidnon State Bukidnon State University. (2018), Butter and Beest (n.d.), Chell and Athayde (2009), and the Research and Extension Unit of the Food and Agriculture Organization of the United Nations (2017). The assessment form was an online, Google Form, which was examined for its validity by using the following steps:

- 2.1 The validity of the content was established by five experts, who were well-versed in the areas of curriculum, teaching, and measurement by using Rovinelli and Hambleton's (1977) Indices of Item-

Objective Congruence (IOC). The results identified that every question had an IOC value higher than 0.50 (Chaichanawirote & Vantum, 2017).

- 2.2 The Assessment Trial was conducted with 30 students in a non-experimental school, Prapassornwittaya Wat Srinual School, in order to analyze the alpha coefficient of reliability by using Cronbach's method. The analysis illustrated that the alpha coefficient of confidence for the entire questionnaire had been 0.94. The analysis of each area indicated the following: 'Energy' had been 0.88, 'Self-efficacy' had been 0.84, 'Creativity & Independence' had been 0.95, the 'Capacity to Navigate Complexity' had been 0.89, and the Risk-propensity had been 0.83. The alpha coefficient of confidence had been higher than the specified criterion, which was equal to or higher than 0.70 (UCLA: Statistical Consulting Group, 2016).

#### 4.3. Data Analysis

1. The 90/90 Standard was employed to analyze the data and to compare the post-experiment of teachers' learning outcomes. The first 90 represented the percentage of the mean scores, which had been obtained from the teachers' knowledge test. The latter 90 represented the percentage of teachers, who had passed the test in accordance with all of the objective criteria (Yamkasikorn, 2008).

2. To analyze the data and to compare the results of the teacher's learning outcomes and the student's innovation skills assessment in the pre-experimental test and the post-experimental test, the t-test dependent statistic was employed.

### 5. Research Results

The R1&D1 phase produced "An Online Program to Develop Teachers to Enhance Innovation Skills," which included two projects and their manuals as follows:

- 1. The teachers' learning development project** Based on the following literature review, the six teachers' self-learning manuals, which were based on a variety of perspectives from academics and agencies, were created:

- 1.1 The Definition of Innovation Skills** was based on perspectives from Albuquerque (2013), Bellevue College (n.d.), Business (2021), Center for Management and Organization Effectiveness (n.d.), Dwyer (n.d.), Skills You Need (n.d.), Toolshero (n.d.), and Vocabulary.com (n.d.).

- 1.2 The Significance of Innovation Skills** was based on perspectives from Boundless Management (n.d.), Cleverism (n.d.), Henderson (2017), Kappe (n.d.), Kylliäinen (2019), Nolan (2016), and Sokolova (2015).

- 1.3 The Characteristics of Innovation Skills** were based on perspectives from Inusual (2018), Premuzic (2013), and Zenger (2015).

- 1.4 The Guidelines for Innovation Skills Development** were based on perspectives from Baiya (2018), Cherry (2019), Francisco (n.d.), Hengsberger (2018), Jonathan (2014), Kaye (2018), Kim (2015), Kylliäinen (2018), Sloane (2009), and Stack (2013).

- 1.5 The Steps of Innovation Skills Development** were based on perspectives from Boutelle (n.d.), Landry (2017), Magazine Spring (2007), Molloy (2019), and Pisano (2020).

- 1.6 The Assessment of Innovation Skills** was based on perspectives from Bukidnon State University (2018), Butter and Beest (n.d.), Chell and Athayde (2009), and Research and Extension Unit, Food and Agriculture Organization of the United Nations (2017).

- 2. The utilization of the Teachers learning outcomes in the students' innovation skills development project** For this project, a practice manual was generated with instructions and details on important issues: 1) the Anticipated Characteristics of Innovation Skills in students, 2) the Guidelines for Innovation Skills Development, and 3) the Steps for Innovation Skills Development. In the manual, teachers' self-assessment form for utilizing the learning outcomes and for reflecting on strengths and weaknesses was attached.

The research, which had been carried out through the R2&D2 to R5&D5 steps, resulted in the development of six teachers' learning manuals, a manual that implemented the teachers' learning outcomes for student development,

the teacher's learning outcome test, and an innovation skills assessment form for the students, which can be found the original in Thai on the following websites:

- 1) The Self-Learning Module: [http://www.mbuisc.ac.th/phd/A\\_R&D%20Modules/KerkKiet.pdf](http://www.mbuisc.ac.th/phd/A_R&D%20Modules/KerkKiet.pdf)
- 2) The Teacher Practice Level Assessment Form:  
[https://docs.google.com/forms/d/e/1FAIpQLSf6AGmhFa7togy\\_AloYncOe6ieJUPiHS\\_mxJO2HawwkEzeNVg/viewform](https://docs.google.com/forms/d/e/1FAIpQLSf6AGmhFa7togy_AloYncOe6ieJUPiHS_mxJO2HawwkEzeNVg/viewform)
- 3) The Teacher's Learning Outcomes Test from:  
[https://docs.google.com/forms/d/e/1FAIpQLScvII8QF6bbT8cCMx9PFrUR\\_-RV-01p7k6MLUB3hUuCeKpgLA/formResponse](https://docs.google.com/forms/d/e/1FAIpQLScvII8QF6bbT8cCMx9PFrUR_-RV-01p7k6MLUB3hUuCeKpgLA/formResponse)
- 4) The Innovation Skills Assessment Form of students:  
[https://docs.google.com/forms/d/e/1FAIpQLScovGBMjbLmAtHMK7kWIELJ83\\_Akn7zw9ZQlBh05GUnrDP5UQ/viewform](https://docs.google.com/forms/d/e/1FAIpQLScovGBMjbLmAtHMK7kWIELJ83_Akn7zw9ZQlBh05GUnrDP5UQ/viewform)

The manuals, test, and assessment form, which had been created through the phases of R2&D2 to R5&D5, were examined in the field experiment using the pre-experimental research with a one group pre-test/post-test design. The experimental area was the general education classes at the Pariyattidhamma Demonstration Pali School Mahachulalongkornrajavidyalaya University at Wat Si Sa Ket (Grades 7-12), which is under the Division of Buddhist Studies National Buddhism Office. It is located in the Mueang District of Nong Khai Province. This study adopted purposive sampling to select the experimental group. The 11 teachers and 204 students were included in the target groups. The findings demonstrated that the results of the research had been in accordance with the assumptions based on the specific criteria of "An Online Program to Develop Teachers to Enhance Innovation Skills" with two projects and manuals and that it had been proven effective. The details of the findings are shown below:

1) The post-test results from the teacher's learning outcome test correlated with the standard of 90/90. The first 90 represented a percentage of the mean post-test scores, which was 33.09 points out of 36 (91.92 percent) and was higher than the specified criterion (90). The latter 90 was the percentage of the teachers, who had been able to complete all objectives. The result indicated that 92.42% of 11 teachers had been able to pass all objectives on the exam. The number was, therefore, higher than the specified criterion (90).

2) The results of the pre-experimental test mean score of the 11 teachers had been 27.72, and the standard deviation had been 2.76. Meanwhile, the post-experimental test mean score had been 33.09 and the standard deviation had been 2.07. After the data had been analyzed by using the t-test dependent, the mean score of the post-experimental test was found to be statistically significantly higher than the mean score of the pre-experimental test at 0.05, which is shown in Table 1.

Table 1: The t-test dependent results from comparing the teachers' learning outcomes before and after the experiment

Testing	Sample sizes	Means	Standard Deviations	t
Before	11	27.72	2.76	14.750*
After	11	33.09	2.07	

\*p < 0.05

3) The assessment results from the innovation skills before the experiment with the 204 students indicated that the mean had been 3.49 with a standard deviation of 0.19. Meanwhile, the results from the assessment after the experiment had shown a mean of 4.00 with a standard deviation of 0.15. Therefore, after the data had been analyzed by using a t-test dependent, the mean score of the post-experimental assessment had been statistically significantly higher than the mean score for the pre-experimental assessment at 0.05, which is shown in Table 2.

Table 2: The t-test dependent results when comparing the students' innovation skills before and after the experimental assessments

Assessments	Sample sizes	Means	Standard Deviations	t
Before	204	3.49	0.19	28.73*
After	204	4.00	0.15	

\* p &lt; 0.05

## 6. Discussion

The R&D study of “An Online Program to Develop Teachers to Enhance the Innovation Skills of Students” values the relevant perspectives of academics, from which the complete knowledge of insight was constructed for this search. The results of this study were consistent with their assumptions and the following concepts were applied. **The first concept** prioritized the awareness of the development of the 21<sup>st</sup> century skills for students because these skills are now more important to students than ever before. Not only do they provide a framework for successful learning in the classroom, but they also ensure that students can thrive in our modern and highly technological world, in which learning can never stop and changes are taking constantly place. Furthermore, these skills are also tremendously important to the well-being of the nation (Ross, 2017; Rooptam & Sanrattana, 2021). **The second concept** placed emphasis upon international knowledge, which is spread throughout the Internet. This is especially true for the verified knowledge that allows the Internet audience to inspect the qualifications of the author and the validity of his/her content. Furthermore, the knowledge from the Internet is dynamic and is constantly being updated. A large number of online websites and data archives are able to receive real-time updates. This allows users to download up-to-date information, which has been verified and is ready for distribution (ACT Bengaluru, 2021). **The third concept** is associated with the concept and benefit of conducting the development of teachers with the hope that teachers will, in turn, make use of their learning outcomes in order to develop their students. This teacher professional development concept is based on the following statements: “Successful Teachers, Successful Students.” (Evans & Beteille, 2019), and “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 concept and benefits as Promrub and Sanrattana (2022) commented in the research on “Online Program to Empower Teacher Learning to Develop Students' Digital Literacy Skills” that “research that has been designed to focus on any activity of teacher professional development must acknowledge the benefit of students as the ultimate goal should be encouraged, supported, and disseminated”. **The fourth concept** is based on the idea that knowledge and action are power which means transmitting the idea that having and sharing knowledge is the cornerstone of reputation and influence, and is, therefore, power (Azamfirei, 2016). As in John F. Kennedy's quote: “Knowledge is not power; knowledge plus action equals power.” (Lovel, 2017), and on the statement: “Knowledge is power, but without action is useless.” (Ofpad, the school of Genius, n.d.). **The fifth concept** is concerned with disseminating the innovations from results of the research to the target population so that members of the population can put them to practical use. R&D methodology aims at investigating the body of knowledge from a variety of concepts and perspectives so that a manual for teacher development can be created. The knowledge, which had been acquired, was examined for its quality. An experiment was carried out with one of the Phrapariyattidhamma Schools, which was an experimental site, and the results led to an effective invention. After that, the innovation was disseminated to benefit the target population, which consists of the other Phrapariyattidhamma Schools across the country. **The sixth concept** aimed at disseminating research innovations via the Internet due to the rapid growth of the Internet given its definite advantages over traditional forms of communication. Its flexibility, speed, and accessibility make it a clear path for disseminating research (Duffy, 2000). **The seventh concept's** focal point is having an awareness of the limitations of the target audience's English language skills when needing to examine the innovative research results. Therefore, the obtained knowledge was translated into Thai. The online manuals were also written in Thai because in Thailand, the English language is still considered a foreign language. Thai people do not use English as an official language or as a second language as in the former British colony countries. However, when considering those individuals, who were fluent in English and who wished to study from the source language, the links to the original webpages were also included in the manuals. **The eighth concept** focused upon self-learning and was based on the concept of: Anyplace, Anywhere, Anytime. The many benefits for teachers and students, associated with using the concept of self-learning, consist of the following: 1) learning at their own pace, 2)



developing ownership of their learning, 3) gaining better insights into their learning, 4) having the freedom to use various modes of learning, 5) having the most engaging learning experiences when learning through mobile devices, 6) demonstrating greater learner awareness, 7) being willing to try out new things and learn new skills, 8) becoming an expert, 9) prompting more effective learning for the learners, 10) boosting the learners' levels of self-esteem and self-reflection, 11) creating a stress-free learning process, and 12) allowing the learning to become more meaningful (Suvin, 2021).

## 7. Recommendations

It is the belief of the research team that encouraging teachers is essential to realizing the importance of accelerating the development of all the 21<sup>st</sup> century skills. The skills are covered in three areas: 1) learning & innovation skills, which are comprised of creativity & innovation, critical thinking & problem solving, communication, and collaboration; 2) information, media, and technology skills, which are composed of information literacy, media literacy, and ICT (information, communications, and technology) literacy; and 3) life and career skills, which consist of flexibility & adaptability, initiative & self-direction, social & cross-cultural skills, productivity & accountability, and leadership & responsibility (Battelle for Kids, 2019). However, given that most Thai people, including Thai teachers, do not possess adequate English skills, the lessons, which have been learned from this research, illustrate the need to prioritize the development of **“English skills”** in Thailand. Furthermore, as a global language, English is important and represents the best way to bridge the gap between people from diverse backgrounds. The Internet has content that is primarily in English. Therefore, having the ability to utilize the power of English is important in our modern-day world. Hence, to use the internet, one must have at least a basic level of English.

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## Appendix

The student's Innovation Skills Self-Assessment Form.

Innovation Skills Qualifications	Self-assessment levels				
	5	4	3	2	1
<b>Energy</b>					
1) I always set goal for my work					
2) I have got a lot of energy to work everyday					
3) I am actively studying my chosen subject.					
4) I enjoy assisting people.					
5) I am excited and encouraged when I create something that no one else has been able to do.					
<b>Self-efficacy</b>					
6) I seek for alternative activities outside of school that I can control and that do not give me any trouble.					
7) In the future I would like to do challenging work that interests me.					
8) I am confident that if I start doing something, I can accomplish it.					
9) I will participate part in activities that I am interested in. It barely matters whether or not my best friend joins.					
10) I have faith in my own ideas. I'll do what I believe to be the best course of action.					
11) I believe that students should provide feedback on the school's policies and procedures.					
<b>Creativity and Independence</b>					
12) I enjoy coming up with fresh ideas for projects.					
13) I enjoy coming up with fresh ideas. in their own unique manner					
14) I enjoy thinking about how I might improve my job.					
15) I believe that hidden challenges exist in complicated issues.					
16) I enjoy experimenting with new techniques. Let us address the issues that we are confronted with.					
17) I can combine fresh ideas with current ones.					
18) In my duties, I feel free to try new things.					
19) I am a person that is constantly open to new experiences.					
20) I believe I am capable of doing a good job on my own.					
21) I am a person who is capable of handling day-to-day activities.					
22) I want to study with creative activities.					
23) I prefer studying with activities more than just sitting at my desk.					
<b>Capacity To Navigate Complexity</b>					
24) I am skillful in comprehending and resolving challenges.					
25) I am skillful in making decision in a group.					
26) I am skillful in strategy planning.					
27) I like seeking for work improvement.					
28) I listen to what people say when they come up with a new idea.					
29) I concentrate on improving what I am in charge of. as well as discovering new opportunities					
<b>Risk-propensity</b>					
30) I am willing to take risks in my job.					
31) I enjoy a good challenge. Despite the fact that the challenge may have forced me to take risks.					
32) I am willing to take the risk to create an innovation.					
33) Colleagues find me to be a thought-provoking person.					
34) I believe it is pointless to exert strict control over work.					
35) I am aware that not every project involved will be successful.					