

# The Development of EduwT@ps Application for Education Program Students

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This study aims to develop the interactive Educational Workplace Thinking Styles and Problem Solving Stimulator (EduwT@ps). The proposed development will stimulate thinking and problem-solving skills among education students, enhancing graduate employability. It is based on the ADDIE model, using Adobe Flash CS6 and Flipbook Professional software, to stimulate thinking and problem-solving skills in accordance with Sternberg's 13 Mental Self-Government theory. Case-based learning simulates real-life workplaces (educational institutions), based on Clyde Freeman Herreid's 11 rules. The ten created cases were divided into five categories of workplace problems. The 10 cases were evaluated, with seven information technology and academic experts. This study involved mixed method data collection. The quantitative data indicated that the average measure for Intra-class Correlation Coefficient was .875 with a 95% confidence interval from .603 to .991 ( $F(3, 81) = 8.559, p < .000$ ). The qualitative data showed near-perfect agreement among the experts. In short, the development of this application can expose some education students to actual workplace situations, and simultaneously stimulate their thinking and problem-solving skills.

**Key words:** *Thinking Styles, Problem Solving, Case-based learning.*

## Introduction

The quality of graduates is measured by their soft skills, in addition to their academic achievement. This statement is in line with empirical evidence from previous studies conducted by Tang, Nor Hashimah and Hashimah (2014) and Yahya (2011). A literature review by Sumanasiri, Mohd Shukri and Ali (2015) revealed that graduate employability was recognised as the main objective of university education around the globe. Sarkar, Overton, Thompson and Rayner (2016) also agreed that graduate employability had been the key issue for university

graduates, as they had to face a very competitive employment sector. Therefore, thinking and problem-solving skills need to be demonstrated to potential employers, both during industry training, practicum and during interviews, because in these situations graduates have the opportunity to promote themselves to be accepted for work. According to Robles (2012), in previous studies 75% of long-term success in employment depended on soft skills, while 25% depended on technical knowledge. Thus, graduates need to have the skills to think and make decisions in preparation for the work environment. These skills can actually be trained and instilled through learning methods that develop the marketability of graduates (Mohd. Yusof, Seri Bunian, & Abdul Hamid, 2015).

However, there is a gap between the soft skills owned by employees, and employers' desires especially as to critical thinking and problem-solving skills (Tang, Nor Hashimah, & Hashimah, 2014; Muhammad Hazrul, 2012). More recent studies by Sarkar, Overton, Thompson and Rayner (2016) and Messum, Wilkes and Peters (2017) indicate that critical thinking skills and problem solving were among the skills considered important by both employers and employees. Thus, the interactive EduwT@ps application was developed to stimulate thinking and problem-solving skills among education students, to enhance thinking and problem-solving skills. Ten workplace cases were simulated. The responses were based on Sternberg's 13 Mental Self-Government thinking styles.

## Literature Review

High-level thinking skills include the ability to think critically, solve problems and make decisions (Abdullah, 2014; Yee, Jailani, & Razali, 2011; Yee, Nurul Nadiah, & Tee, 2009). According to Sharifah Amnah (2009). Thinking style involves solving problems and making decisions. Sternberg (1988) believes that one's thinking style is closely related to the type and tendency of one's activity. However, one has to know how to manage and govern each of them, which is in line with the function of a government, known as Mental Self-Government. Each individual has his or her own style of thinking. However, this does not mean that we are bound by just one type of thinking style. According to Sternberg (1994), diversity of thinking styles is not good or bad *per se*, but it does indicate differences in one's thinking style and adaptability.

Sternberg's Mental Self-Government theory underlies this study. Accordingly, individual thinking styles are divided into five domains, namely: i) Scope (Internal and External thinking style), ii) Function (Legislative, Executive and Judicial thinking styles, iii) Form (Monarchic, Hierarchic, Oligarchic and Anarchic thinking styles), (iv) Level (Global and Local thinking styles) and (v) Leaning (Liberal and Conservative thinking styles). Therefore, future teachers and educational program students should be exposed to diversity in their thinking styles. This is because their prospective students will have diversity in their thinking styles, and teachers need to be more flexible in their teaching and learning approach to cater to differently thinking

learners (Zhang, 2002; Sternberg, 1999). Zhang (2002) also believes that educators need to engage students in activities that involve a variety of thinking styles, to develop their cognition. Although thinking styles are acquired through socialization, they can be taught or learned (Fan, Zhang, & Chen, 2018; Sternberg, 1999).

## **The Conceptualization of EduwT@ps**

### ***Case-Based Learning***

The case-based approach is used in this application. It is a learning method in which students engage in specific, realistic scenarios, and is effective at developing professional skills (Schwartz, 2014; Herreid, 1997). It is student-centred and increases student's proficiency via written or oral communication approaches (Schwartz, 2014). According to Herreid (2012; 2005; 1997), teachers act as facilitators, while students are required to analyse and solve problems or questions that do not have one correct answer. Herreid (1997) provides that case-based learning follows eleven basic rules. It: i) Tells a story, ii) Focuses on interesting issues, iii) Is set in the past five years, iv) Creates empathy with the main character, v) Includes quotations, vi) Is relevant to the reader, vii) Contains pedagogic utility, viii) Provokes conflict, ix) Forces learners to make decisions, x) Is generally applicable, and xi) Is short.

### ***The Design of EduwT@ps***

EduwT@ps was built based on the ADDIE Model, using Adobe flash CS6 and Flipbook Professional software. It is an interactive pedagogical tool for stimulating thinking and problem solving skills, through a case-based learning approach. This application contains 10 cases involving current issues in educational institutions, based on issues that arise in the actual work situation (an educational institution). The cases are divided into categories of problems in the workplace, based on a literature review (Disciplinary problem, Learning problem, Teacher's workload, Limited resources and Interpersonal relationship), using Clyde Freeman Herreid 11 rules (Herreid, 1997). These cases were specifically designed and adapted to fit the construct. They were aimed at simulating 13 thinking styles based on Sternberg's Mental Self-Government theory and thinking skills. Users are able to identify their thinking and problem-solving styles after using the application, by choosing the responses based on Sternberg 13 Thinking Styles of Mental Self-Government theory (Refer Figure 1: Screenshots of EduwT@ps). As there is no correct answer for each question, a score sheet is provided for users to record their scores and justify their answers. This is to ensure that their responses are reliable and meet the purpose of the study, to determine individual thinking styles. EduwT@ps also provides an overview, based on individual scores after users have completed all 10 cases founded on real problems at work. Through the scores, users can identify their styles of thinking and the features of the user's thinking style, by clicking on the link provided. Users can also

identify their dominant and less prominent thinking styles. This will help them enhance the thinking styles which are less prominent.

**Figure 1.** Screenshots of EduwT@ps

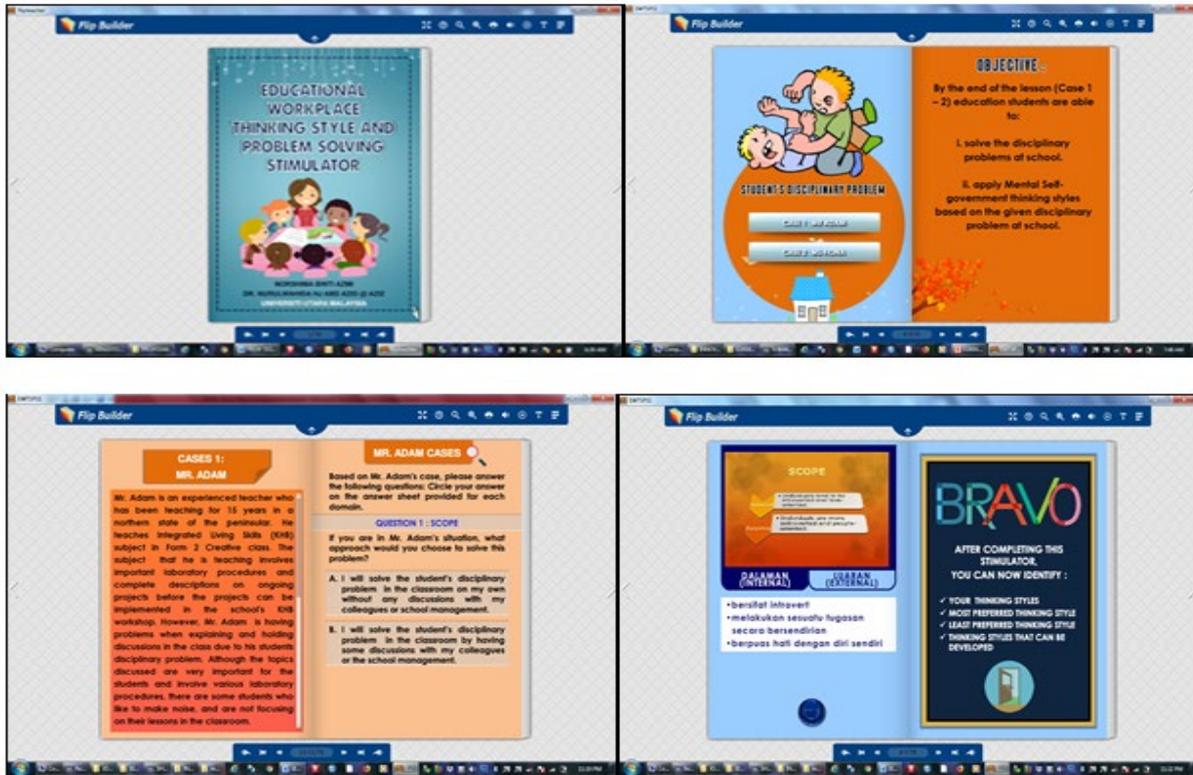
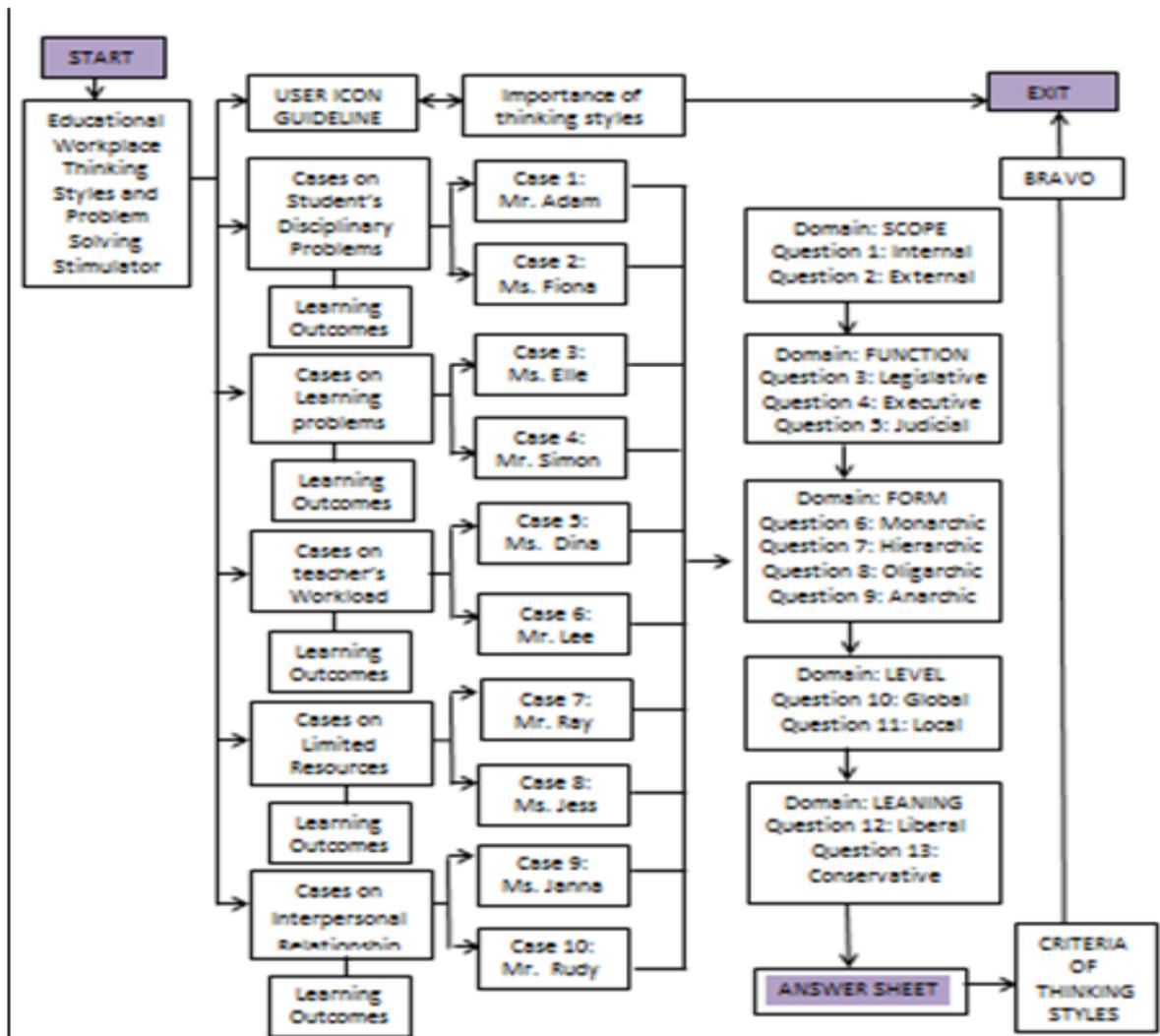


Figure 2 shows the design for cases in the workplace, based on the five main problems that educators face at school: i) Student Disciplinary Problem: Case 1: Mr. Adam and Case 2: Ms. Fiona; ii) Learning Problem: Case 3: Ms. Elle and Case 4: Mr. Simon; iii) Teacher's Workload: Case 5: Ms. Dina and Case 6: Mr. Lee; iv) Limited Resources: Case 7: Mr. Ray and Case 8: Ms. Jess; and v) Interpersonal Relationship: Case 9: Ms. Janna and Case 10: Mr. Rudy. The flowchart of EduwT@ps is shown in Figure 2. Each problem category contains two cases that need to be resolved. The main character for each case is given an appropriate name which does not represent a specific race. This is to avoid discrimination and negative perceptions, following the experts' evaluations and comments. Each case was built based on the 11 rules approach proposed by Herreid (1997).

**Figure 2.** Flowchart of the EduwT@ps design



Below is the example of one of the cases used in this interactive application and the constructs:

### Student's Disciplinary Problem

#### Objective

By the end of the lesson (Case 1 – 2), education students are able to:

- solve disciplinary problems at school
- apply Mental Self-Government thinking styles, based on the given disciplinary problem at school.

#### Case 1: Mr. Adam

Mr. Adam is an experienced teacher who has been teaching for 15 years in a northern state of the peninsula. He teaches Industrial Design (RBT) in Form 2 Creative class. The subject that

he is teaching involves important laboratory procedures and complete descriptions on ongoing projects, before the projects can be implemented in the school's workshop. However, Mr. Adam is having problems when explaining and holding discussions in the class due to his students' disciplinary problem. Although the topics discussed are very important for the students and involve various laboratory procedures, some students like to make noise, and are not focusing on their lessons in the classroom.

Mr. Adam took a preliminary action. He called the names of students who did not focus during lessons, and wrote their names on the board to draw their attention. If the students were constantly distracting, he did not allow them to leave their classroom at break time, or they were asked to stand in their classroom. In certain circumstances, he had to call their parents to school, to discuss their children's behaviour. However, he found that his actions could not change students' attitudes and overcome disciplinary problems in class.

There is a suggestion that Mr. Adam impose a heavier action, like hitting and punishing the problematic students, the school students are accustomed to such punishment. However, Mr. Adam intends to impose a punishment in his own way, to stop their misconduct. But he is worried that it will hurt the students and affect his future career.

**Based on Mr. Adam's case, please answer the following questions: Circle your answer on the answer sheet provided for each domain**

### **Question 1: Scope**

If you are in Mr. Adam's situation, what approach would you choose to solve this problem?

- A. I will solve the student's disciplinary problem in the classroom in my own without any discussions with my colleagues or school management.
- B. I will solve the student's disciplinary problem in the classroom by having some discussions with my colleagues or the school management.

### **Question 2: Function**

In your opinion, what is the best way to handle the disciplinary problem among the students of the 2 Creative Class?

- A. I will create a method or a way to solve the student's disciplinary problem in the 2 Creative class.
- B. I will report to the administrators about the 2 Creative students' disciplinary problem and resolve the problem according to the procedures set by the them.
- C. I will evaluate the current situation in the 2 Creative class, evaluate the students' attitudes as well as imposing punishment on students based on their level of misconduct.

### **Question 3: Form**

What is your opinion about the best approach to solve the disciplinary problem among the 2 Creative students?

- A. I will focus on the issue about 2 Creative students disciplinary problem until it is over, spend my time and energy on that and ignore other problems in school.
- B. I will systematically solve the 2 Creative disciplinary problem, determine the priority of a problem and follow the appropriate approach.
- C. I will solve the 2 Creative disciplinary problem simultaneously with other problems in school because all issues in school are equally important.
- D. I will address the 2 Creative disciplinary problem randomly, in my own way without being too attached to school rules.

### **Question 4: Level**

If you are in Mr. Adam's shoe, what is your action to overcome the disciplinary problem in 2 Creative class?

- A. I will continue teaching and learning as usual because I think discipline is a common problem in schools.
- B. I will solve the discipline problem in detail based on the cause of a problem.

### **Question 5: Leaning**

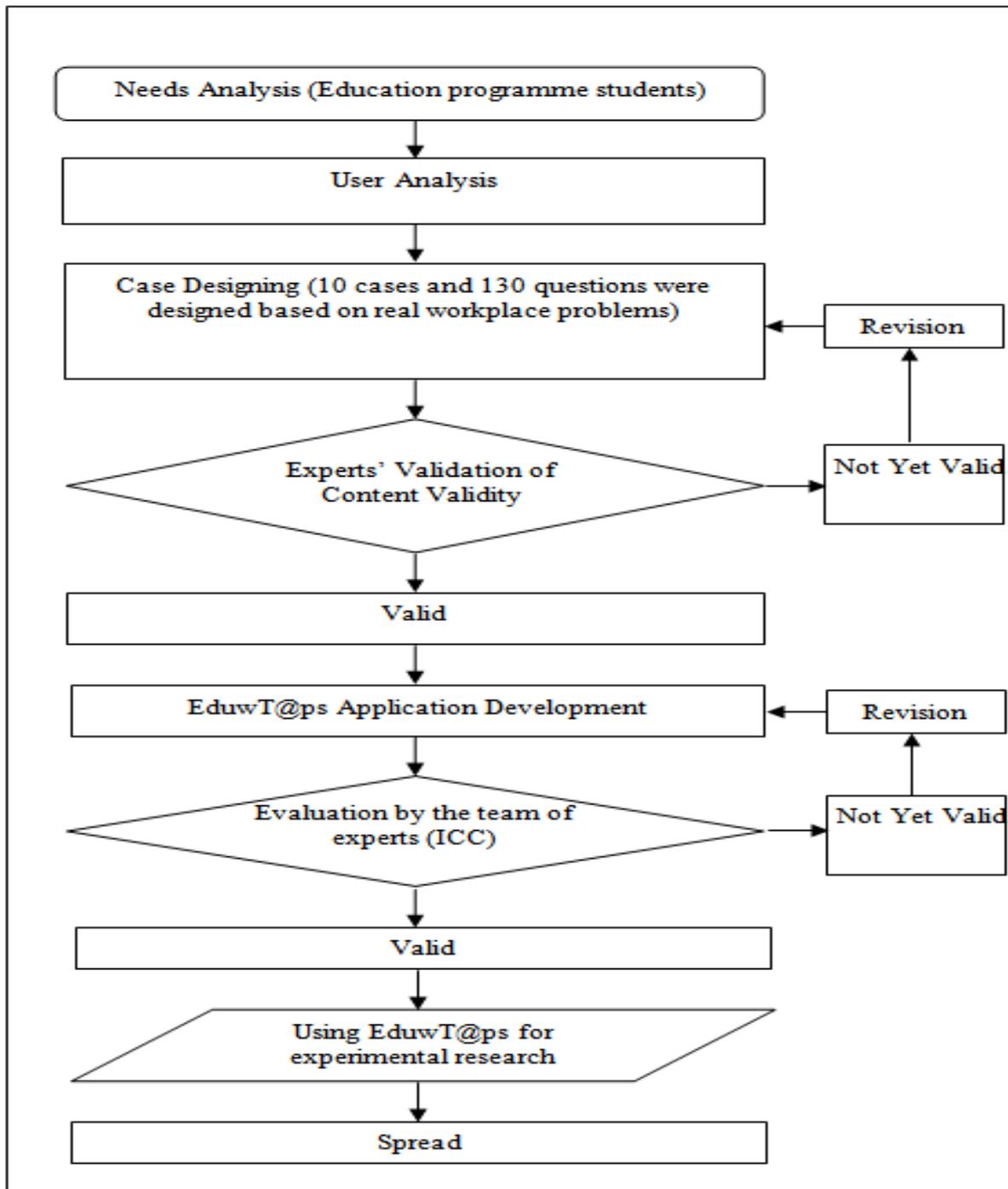
What is your suggestion on the appropriate method should be taken by Mr. Adam to tackle the disciplinary problem among 2 Creative students?

- A. By selecting a method that teachers have never done in the school to discipline 2 Creative students.
- B. By solving the disciplinary problem of 2 Creative students according to the rules that are the norms of the teachers in the school.

### **The Development of EduwT@ps**

All the cases and items in EduwT@ps are a new contribution to stimulating thinking and problem-solving skills among the education program students. This application had to go through the process of evaluation by academic experts, to assess content validity. The table of content validity (rubric) for the cases was based on the 13 features of Sternberg's (1988) Mental Self-Governmental thinking styles. Seven experts were involved in the evaluation for content validity of the EduwT@ps (three lecturers in a relevant area from a higher learning institution, and four experienced teachers and school administrators). Ratings were based on a 10-point Likert scale. The procedure for development of EduwT@ps is shown in Figure 3.

**Figure 3.** EduwT@ps Development Flowchart



**Source:** Aji, S.D., Hudha, M.N., Huda, C.; Nandiyanto, A.B.D.; and Abdullah A. G. (2018). The improvement of learning effectiveness in the lesson study by using e-rubric. *Journal of Engineering Science and Technology* 13(5), 1181-1189.

Figure 3 indicates the four phases involved in the development of EduwT@ps. The first was needs analysis. Second was user analysis, and the third was content validity. Needs analysis

was carried out to collect the data on thinking styles and problem-solving skills, among the Education Program students. The result showed that students needed tools to stimulate their thinking and problem-solving skills. User analysis was conducted to ensure that the 10 cases and 130 responses could simulate all the 13 types of thinking styles and problem solving skills among the students.

Next, the EduwT@ps was evaluated in the fourth phase by seven experts. That was to justify its content validity and reliability, to determine the further development of the application. If the content validity and reliability were low, the researchers had to revise and enhance the case simulations. After the EduwT@ps development, a group of experts evaluated this application. They focused on its function, navigation, interaction and design. Intra-class Correlation Coefficient was obtained. The panels' opinions were recorded for enhancement of the application. Its readiness depended on the experts' approval.

### **Research Questions**

- What is the mean score for each workplace case (educational institution)?
- What is the content validity of the EduwT@ps application?
- What is the reliability value of Intra-class Correlation Coefficient (ICC) among the experts?
- What are the experts' opinion about EduwT@ps application?

### **Results**

#### ***Descriptive Analysis of The Mean Score for Each Workplace Case***

Table 1 indicates the outputs for SPSS data, for all the cases, based on the experts' evaluation of the EduwT@ps application. The data showed high mean values for all 10 cases tested. They ranged from 8.57 to 9.43, based on the seven academic experts. All assessors were to evaluate cases presented directly through a Power Point presentation by the researcher. Ratings were based on a 10-point Likert scale, from 1 (very weak) to 10 (excellent).

**Table 1:** Content Analysis for EduwT@ps Application

CASE	Mean	Std. Dev	N
Case 1	8.86	.690	7
Case 2	9.14	.690	7
Case 3	9.14	.690	7
Case 4	9.14	.378	7
Case 5	9.14	.900	7
Case 6	9.14	.690	7
Case 7	8.57	.535	7
Case 8	8.86	.900	7
Case 9	8.86	1.069	7
Case 10	9.43	.787	7

### *Content Validity of EduwT@ps*

The expert evaluation of content validity had two phases. The first involved three evaluators. They were lecturers from institutions of higher learning with expertise in curriculum and instruction, psychology, educational management and linguistics. The second phase involved four senior teachers; namely a Senior Science Teacher, Senior Language Teacher, Senior Islamic Education Teacher, and Technical and Vocational Senior Teacher. Table 2 shows some suggestions from the panels to improve on EduwT@ps content.

**Table 2:** Suggestions for Content Improvement by Experts

No	Comments and Suggestions	After Amendments done
1	How to make sure that app users actually responding to what they think and not just randomly giving the response.	A score sheet is prepared where the user is required to provide a reason for each response.
2	The value of empathy should also be present in the item being built. Need to start a sentence with the word 'I'.	Eg: I solved the problem through discussions with the school management.
3	Avoid troubleshooting suggestions: Correct the sentence: Case 5 Ms Dina is trying to step down from her position as PTA secretary because she is overwhelmed by the responsibilities she is given. In fact, she was considering applying for a school transfer.	Dina plans to fix the situation. Unfortunately, she feels overwhelmed by the other duties of being a PTA secretary and the coach of the school's Basketball Team that requires high commitment. Teacher Dina felt overwhelmed by the responsibility she was given.
3	Avoid troubleshooting suggestions: Case 6 Mr. Lee is now in a dilemma to continue his career as a teacher or quit his job.	Mr. Lee is now pressured to continue his career as a teacher.
4	Avoid stereotypes; Associate the items that are built with the case. Case 6: Item 1 I will do all the work by myself for my own satisfaction.	I will carry out the tasks of the committee (panitia), PTA and co-curriculum individually

***Reliability of the content of EduwT@ps***

Inter-rater reliability was assessed by seven previously appointed academic experts. The Intra-class Correlation Coefficient (ICC) Two-Way Mixed was used to meet the requirements and assumptions suggested by Landers (2015). The results of the Inter-rater reliability data analysis were used to evaluate and measure the agreement between the seven reviewers, as to the EduwT@ps content. The SPSS output data in Table 3 shows a high degree of reliability, based on expert ratings for that content. According to Table-II, the average Intra-class Correlation Coefficient for the content validity of the application was .899, based on a 95% confidence interval of .737 to .979 ( $F(6,54) = 10.355, p < 0.001$ ). The high reliability value of the EduwT@ps content means that the cases and items tested in this application are appropriate as a treatment for the experimental group, because it is considered high and satisfactory (Miller, Linn & Gronlund, 2013).

**Table 3:** Intra-class Correlation Coefficient for the content validity of EduwT@ps

Intra-class Correlation Coefficient							
	Intra-class Correlation <sup>b</sup>	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.470 <sup>a</sup>	.219	.827	10.355	6	54	.000
Average Measures	.899 <sup>c</sup>	.737	.979	10.355	6	54	.000
Two-way mixed effects model where people effects are random and measuring effects are fixed.							

- a. The estimator is the same, whether the interaction effect is present or not.
- b. Type A Intra-class Correlation Coefficients using an absolute agreement definition.
- c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

### Experts' Opinions About EduwT@ps Application

Inter-rater data was obtained from all evaluators and analysed. The researcher took the next step of refining the storyboard content of the EduwT@ps application. That content is essential for treatment. Steps were taken, after taking into account all written and verbal comments and reviews from experts during the presentation, to improve the application's content. The refinement of the application content had already begun after the first phase. Therefore the second phase focused on the suitability of all cases built on the actual situation at work, and the suitability of the built-in icon. Below are the experts' overall reviews or opinions:

#### Overall Assessment Reviews

Reviewer 1

"The cases referred to are the 'genuine' (real) cases".

Reviewer 2

"The built-in storyboard is very engaging and meaningful to apply. However, some comments and suggestions for improvement were noted during the discussion. Please take action on the suggestions".

Reviewer 3

"A study that will have a significant impact on the teaching profession. It is advisable to make changes to the items that were discussed during the presentation".

Reviewer 4

“Research that builds on and helps teachers and students in schools, effectively”.

Reviewer 5

“This study is particularly relevant because these cases are created and faced by either new or experienced teachers. This study can also have a positive impact on students (educational programs) in preparing them to face real life situations as educators”.

Reviewer 6

“The content of the application is best used in the education program graduates to expose them to the real situations that educators face”.

Reviewer 7

“Excellent study on solving problems at school level”.

## **Discussion**

Teachers and prospective teachers are important groups in community which should possess soft skills (Tang, Nor Hashimah & Hashimah, 2014; Yahya, 2011). This is because the teaching profession opens up opportunities for them to become agents of community development. Therefore, in addition to skills and mastering knowledge in their respective subjects, teachers should have all the necessary soft skills to meet current educational needs (Tang, Nor Hashimah, Hashimah, 2014). Knowing about thinking and problem-solving skills, and optimising them in the workplace, can protect teachers from issues and problems that may later affect their career and future in education.

This study focuses on the construction of cases that encourages students to think and solve problems. The cases are very much related to work-based problem-solving, in educational institutions for future teachers. Research findings indicate that the percentage score for each case item was above 80%. Therefore, the evaluator’s validity exceeded 80% in total, which is considered high and satisfactory. The high mean value for content validity indicated that all raters had mutual agreement, and gave positive feedback that the EduwT@ps tool application can effectively enhance thinking styles and problem-solving, amongst education students. The cases and constructs developed were highly reliable and received positive remarks or opinions from the experts.

The findings also demonstrated that the average Intra-class Correlation Coefficient for the content validity of the application was .899, based on a 95% confidence interval of .737 to .979 ( $F(6,54) = 10.355, p < 000$ ). The high reliability value of the content of the EduwT@ps proves that the cases and items tested in this application are considered high and satisfactory.



## **Conclusion**

The placement of postgraduate education is no longer a guarantee. The Malaysian Ministry of Education is no longer promising placement to the graduates of education programs in higher learning institutions (Education Services Commission, 2013). The implication is that education graduates need to compete in the open market, need to apply for interviews, and will only be placed in schools after passing interviews and certification by the Education Services Commission (Education Services Commission, 2013).

Therefore, the use of real cases in the workplace enhances students' understanding of current issues, through visualization of real scenarios (Suraiya, Ahmad Raflis, Kadir & Mohd Yusof, 2014). This can prevent potential teachers from making poorly-informed decisions in the workplace. This research confirms that all the cases developed in EduwT@ps reflect high validity rates, due to the high mean values obtained and positive comments from experts. Thus, this pedagogical tool can be used for future experimental studies regarding thinking styles and problem-solving skills.



## REFERENCES

- Abdullah Mohd Noor. (2014). Teaching thinking skills: Redesigning classroom practices. Brunei : Universiti Brunei Darussalam.
- Anis Abd. Razak, & Mohd. Farid Shamsudin (2019). The influence of atmospheric experience on theme park tourist's satisfaction and loyalty in Malaysia. *International Journal of Innovation, Creativity and Change*, 6(9).
- Armend Tahirsylaj & Ninni Wahlström (2019) Role of transnational and national education policies in realisation of critical thinking: the cases of Sweden and Kosovo, *The Curriculum Journal*, 30(4), 484-503, DOI: 10.1080/09585176.2019.1615523
- Education Services Commission (2013). Malaysia Ministry of Education. Retrieved from <https://www.spp.gov.my> > corporate > function.
- Eko Susanto, Yuni Novitasari, & Syamsu Yusuf (2018). Development of Creative Personality Inventory (CPI): Hypothetical concept. *International Journal of Innovation, Creativity and Change*, 4(2).
- Fan, J., Zhang, L., & Chen, C. (2018). Thinking styles: Distinct from personality? *Personality and Individual Difference*, 125, 50-55.
- Herreid, C.F. (1997). What makes a good case?: Some basic rules of good storytelling help teachers generate student excitement in the classroom. *Journal of College Science Teaching*, 27(3), (163-165).
- Herreid, C.F. (2005). Using case studies to teach science. *Education: Classroom methodology*. American Institute of Biological Sciences. Dimuat turun daripada <https://eric.ed.gov/?id=ED485982>
- Herreid, C.F. (2012). The future of case study teaching in science. University of Buffalo, USA.
- Landers, R.N. (2015). Computing intraclass correlations (ICC) as estimates of interrater reliability in SPSS. DOI: 10.15200/winn.143518.81744.
- McGriff, S., J. (2000). Instruction System Design (ISD): Using the ADDIE model. Instructional System. College of Education, Penn State University.
- Messum, D., Wilkes, L., & Peters, C. (2017). Senior managers' and recent graduates' perceptions of employability skills for health services management. *Asia-pacific Journal of Cooperative Education, Special Issue*, 18(2), 115-128.



- Mohd Yusof Husain, Seri Bunian Mokhtar, & Abdul Hamid Alias. (2015). Persepsi pelajar kejuruteraan politeknik terhadap kemahiran employability: Satu kajian kes. *Advanced Journal of Technical and Vocational Education*, 1(2).
- Nurulwahida Azid @ Aziz. (2011). Pembinaan dan pengujian modul aktiviti pengayaan berdasarkan kepelbagaian kecerdasan dan kemahiran berfikir dalam kalangan pelajar Maktab Rendah Sains Mara (Unpublished Ph.D Thesis): Universiti Sains Malaysia, Pulau Pinang.
- Nurulwahida Azid, Rafidah Rawian, Sarimah Shaik-Abdullah, & Kiong, T.T.(2019). The development of interactive case-based Smart Thinking and Industrial problem-solving Stimulator to enhance TVET students' thinking skills. *Journal of Engineering Science and Technology*, 14, 2643-2656.
- Paadi, K. (2014). Perceptions on employability skills necessary to enhance human resource management graduates prospects of securing a relevant place in the labour market. *European Scientific Journal*, 129-143.
- Robles, M. (2012). Executive perceptions of the top 10 soft skills needed in today's workplace. *Business Communication Quarterly*, 75(4), 453-465. doi: 10.1177/1080569912460400
- Sarkar, M., Overton, T., Thompson, T., & Rayner, G. (2016). Graduate employability: Views of recent science graduates and employers. *International Journal of Innovation in Science and Mathematics Education*, 24(3), 31-48.
- Schwartz, M. (2014). Teaching methods for case studies. *Instructional Design and Research Strategies, for Learning and Teaching Office*. Ryerson University. Retrieved from <http://Ryerson.ca/lt>
- Sharifah Amnah Syed Ahmad. (2009). Sumbangan peramal kognitif dan bukan kognitif terhadap pencapaian akademik dalam kalangan pelajar di institusi pengajian tinggi awam (Unpublished Ph.D Thesis): Universiti Sains Malaysia, Pulau Pinang.
- Shariffah Bahyah Syed Ahmad. (2013). Soft skills level of Malaysian students at a tertiary institution: A comparative case study based on gender, area of residence and type of schools. *International Journal of Asian Social Science*, 3 (9), 1929-1937
- Sternberg, R.J. (1988). Mental self-government: A theory of intellectual styles and their development. *Human Development*, 3, 197-224.
- Sternberg, R.J. (1994). Strategies for success: Allowing for thinking styles ( Vol. 52, no.3). *Educational leadership*.



- Sternberg, R.J. (1999). *Thinking styles*. Cambridge: Cambridge University Press.
- Sternberg, R.J., & Swerling, L.S. (1996). *Teaching for thinking*. Washington: American Psychological Association.
- Sumanasiri, E. G,T, Mohd Shukri Ab Yazid , & Ali Khatibi. (2015). Review of literature on graduate employability. *Journal of Studies in Education*, 5(3).
- Suraiya Ishak, Ahmad Rafis Che Omar, Kadir Ariffin, & Mohd. Yusof Hussain.(2014). Pandangan pelajar tentang penggunaan kes dalam pembelajaran subjek etika. *Malaysian Journal of Society and Space*, 10(1), 60-69.
- Tang, K. N., Nor Hashimah Hashim, & Hashimah Mohd Yunus. (2014). Novice teacher perceptions of the soft skills needed in today's workplace. *Procedia- Social and Behavioral Sciences*, 177(2015), 284-288. doi: 10.1016/j.sbspro.2015.02.338
- Yahya Buntat. (2011). Keberkesanan kursus kokurikulum berkredit dalam memperkasakan kemahiran insaniah dalam kalangan pelajar institusi pengajian tinggi awam. Project Report. UTeM, Melaka, Malaysia.
- Yee, M. H., Nurul Nadiah Adam, & Tee, T. K. (2009). Kepentingan fungsi gaya berfikir Sternberg dalam institusi pengajian tinggi. *International Conference on Teaching and Learning in Higher Education 2009*, 23-25 November 2009, Kuala Lumpur. Retrieved from <http://eprints.uthm.edu.my/331/>
- Yee, M.H., Jailani Md. Yunos, & Razali Hassan. (2011). The perception of the level of higher thinking skills among technical education students. *International Conference of Social Science and Humanity IPEDR*. 5(2). Retrieved from [ipedr.com/vol5/no2/62-H10167.pdf](http://ipedr.com/vol5/no2/62-H10167.pdf)  
• PDF file
- Zhang, L. F., & Sachs, J. (1997). Assessing thinking style in the theory of mental self-government. *The Journal of Psychology*, 133, 165-180. Retrieved from <http://journals.sagepub.com/doi/pdf/10.2466/pr0.1997.81.3.915>
- Zhang, L. F. (2002). Thinking styles and cognitive development. *The Journal of Genetic Psychology*, 162(2), 179-195. Retrieved from <https://www.andrews.edu/~rbailey/Chapter%20Nine/6879499.pdf>
- Zhang, L. F. (2003). Contributions of thinking styles to critical thinking dispositions. *The Journal of Psychology Interdisciplinary and applied*. Retrieved from <https://www.researchgate.net/publications/8681876>