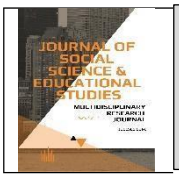

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E-Portfolio As An Assessment Tool in Teaching and Learning: A Survey of Teacher's Perceptions

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ABSTRACT

The COVID-19 pandemic that hit the world has considerably impacted education. Among the debate topics is the uncertainty about assessing student learning outcomes in a pandemic environment. The change from the traditional form of assessment to the digital form is one of the alternative measures that can be considered to address this issue. One of the digital assessment tools implemented online is the E-portfolio. Therefore, this study was conducted to identify teachers' knowledge, perceptions, and software recommendations for using E-portfolio as a digital assessment tool at the school level. The study involved 90 teachers who taught Asas Sains Komputer as study respondents. A questionnaire was distributed to respondents online. Data were analysed using Statistical Package For Social Science (SPSS) version 25.0 to determine the frequency, percentage, mean and standard deviation. Based on the findings of the study, it can be concluded that teachers' general knowledge of E-portfolio shows a high level (mean = 4.06, *sd* = 0.73), and teachers' perceptions of the use of E-portfolio are also at a high level (mean = 4.18, *sd* = 0.62). In contrast, the software recommendation for using E-portfolio is moderately high (mean = 3.36, *sd* = 1.01). These findings have implications for a deeper disclosure of appropriate platforms for implementing E-portfolios as a digital assessment tool, especially at the school level. It is suggested that a module or model be developed to guide teachers in using E-portfolios, especially in *Asas Sains Komputer*.

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INTRODUCTION

Malaysian Education Development Plan (PPPM) 2013-2025 is essential to the Malaysian education system. Education is more effective when everyone has the same opportunities. The national examination system and school-based evaluation have been improved to help students develop their high-level thinking skills. As part of the seventh shift of PPPM, Information and Communication Technology could be used to raise the bar for educational quality at all levels. Technology in the classroom can make learning more effective, and students think more creatively and come up with better ideas (Nor Masharah, 2017; Muhammad Nidzam, 2016); integrating ICT as a teaching medium is essential and beneficial to teachers and students (Elmahdi, Al-Hattami, & Fawzi, 2018; Dlab, Katic, & Candrlic, 2015).

In the face of current globalization, all students acquire knowledge and skills relevant to the Industrial Revolution 4.0. The traditional exam-based education system must be altered using information technology in teaching, learning, and evaluation to increase its effectiveness. Saedah (2020) emphasized integrating information technology into student evaluation to eliminate reliance on obsolete pen and paper assessments. According to Reqan (2018) and Ravikumar (2015), the examination-based assessment does not adequately characterize students' potential, abilities, and development. So in line with the latest technological developments, online assessment is an alternative approach to traditional assessment.

Usually, in the context of assessment, the management of assessment evidence is the main thing that needs to be emphasized by teachers in the management of teaching and learning in the classroom. Teachers 'failure to manage student assessment results in assessment activities not contributing to student learning (Wan Mohd Zuhairi, 2017) and teachers being burdened with clerical tasks (Norazilawati, Norwaliza, Noraini, Eftah, & Aslina, 2016; Tan, 2010). In addition, printed teaching materials are no longer relevant to the latest technological developments (Puji, Sensuseb, Purwandaric, Indra, & Nuralamsah, 2016; Mohd Bekri, 2015). This is because printed materials are static, difficult to update, and limited to information sharing.

The online assessment system has been in use for several years, and its use has assisted teachers in identifying students who require extra attention (Scapo & Molnar, 2018). The E-portfolio is one digital assessment instrument that promotes teaching, learning, assessment, and professional development. Many literature reviews discuss E-portfolios' uses and advantages, especially at the tertiary level. However, research on E-portfolio at the school level, especially in Malaysia, is minimal. Therefore, the study conducted by researchers is significant and relevant to see the perception and acceptance of teachers on the use of E-portfolio at the school level, and it is very necessary.

LITERATURE REVIEW

The current digitalization modernization has transitioned from classic and printed portfolios to electronic portfolio forms. The first-generation digital portfolio uses multimedia CDs, DVDs, and hypertext-based website implementation strategies. In line with technological developments, second-generation E-portfolios are shifting to internet technology, using many techniques developed in multimedia, hypertext, and database-based portfolio processes (Avery, 2016). An e-portfolio is a student's work containing a collection of digital objects (artifacts), combining various media such as audio, video, text, and photographs (Barrett, 2005), encompassing experience, development, achievement, and learning. Rapid technological change makes incorporating digital artifacts in teaching and learning much more manageable. Moreover, Buzzetto-More and Alade (2008) state that electronic portfolios are a valid method for documenting student progress, encouraging student engagement in assessment, showcasing samples of student work, promoting students professionally, and at the same time supporting PdPc, assessment, and the development of professional as well as personal identities throughout the study (Powell, Freeman, & Kahn, 2019).

Rezguia, Mhirib, and Gh'ediraa (2017) stated that there are five (5) primary purposes of using an E-portfolio, namely;

i. Documenting learning and progress over time (Portfolio Learning).
ii. Demonstrate improvement and achievement by linking evidence to performance criteria (Portfolio Assessment).
iii. Prove learning or achievement excitingly (Portfolio Presentation).
iv. As a reflection of learning and experience, identify goals, plan to achieve them, and record progress (Personal Development Portfolio).
v. Allows more than one individual to participate in content development and presentation (Multi-Owner Portfolio).

The use of an E-portfolio is an alternative form of assessment to the traditional form of a portfolio in collecting evidence of student learning to display and record the development of lifelong student learning (Kwok & Hui, 2018) from high-level thinking skills (Jager, 2019), form skills softness of students (Azliza et al., 2018) and able to create collaborative learning (Suhaizal, 2015) actively. An E-portfolio can serve as an authentic assessment tool to empower continuous learning and teacher preparation in facing unexpected situations in the future, for example, the COVID-19 pandemic. E-portfolios are flexible and can serve as an alternative assessment. The E-Portfolio can meet the needs of traditional assessments, but the E-portfolio can also cover the shortcomings of traditional assessments. Misdi and Alrefaie (2020) and Hassanien and Al-Hayani (2020) recommend that using an E-portfolio should be considered an alternative assessment form.

The Malaysian Innovation Agency (AIM) and the Ministry of Education Malaysia (MOE) are collaborating to carry out a pilot project in ten chosen secondary schools in 2019 involving the use of E-portfolios (The Star, 2018). Although there have been studies conducted at the school level, the research is still in its infancy and cannot provide concrete data on using E-portfolios.

Even though teachers are exposed to E-portfolios, how is their acceptance and perception of teachers using them in the assessment of student learning, especially for *Asas Sains Komputer* subjects? As a result of this, the researcher carried out this study. As a result of this, the researcher carried out this study with the following objectives :
i. Identify teachers' knowledge of using E-portfolios in teaching and learning.
ii. To examine teachers' perceptions of using E-portfolio as a digital assessment tool in teaching and learning.
iii. To examine suitable software proposals for using E-portfolios at the school level.

METHODOLOGY

This quantitative study uses survey research to collect data on teachers' knowledge and perceptions of using E-portfolio in assessing Asas Sains Komputer subjects. A set of questionnaires was used in this study for the data collection process. Researchers often use surveys because of their extensive use, and information can be collected directly from respondents in a short time (Chua, 2013).

Study respondents were selected by purposive sampling. Purposive sampling refers to the selection of study respondents having certain characteristics based on the purpose of the study conducted. The study sample selection in this research is the teachers who teach the subject of *Asas Sains Komputer* in secondary schools. Therefore, 90 *Asas Sains Komputer* teachers in the state of Terengganu were involved in this study.

The research instruments used in this study were adapted from Samaa and Khadeegha (2019), Muhammad Nidzam (2016), and literature highlights and adapted to the study's objectives. A total of 22 items were constructed and broken down into three parts*: General Knowledge of E-portfolio, Perceptions on the Use of E-portfolio in ASK subject, and E-portfolio Usage Software Recommendations*.

To ensure that the questionnaire instrument has high validity in terms of content validity and face validity, the researcher has obtained opinions from five experts in related fields to evaluate and refine the constructed

questionnaire. Expert review is important to ensure content construct accuracy, clarity, item appropriateness, and adjustable use of easy-to-understand language applied to respondents. Reviews from experts were taken to improve the research instruments constructed. The results of the expert review found that the questionnaire produced is suitable for use in this study and meets the study's objectives to be achieved. The research instrument was divided into four parts, as shown in Table 1. A 5 -point Likert scale was used to see the respondents 'consent feedback on the items presented.

Table 1: Questionnaire Section

Section	Constructs
A	Demographics of Respondents
B	General Knowledge of E-portfolio
C	Perceptions on the Use of E-portfolio in ASK subjects
D	E-portfolio Usage Software Recommendations

A pilot study was conducted before the actual study was conducted to determine the reliability of the questionnaire; a pilot study was conducted using the same questionnaire on 30 respondents consisting of Asas Sains Komputer teachers and not involved as a sample of the actual study. These teachers were selected because they had the same characteristics as the study sample. The pilot study's findings indicated that the questionnaire's overall reliability, measured by Cronbach's Alpha, was 0.912. Chua (2013) and Arsyathamby & Arumugan (2013) argue that the excellent Cronbach's Alpha value must exceed 0.7. Table 2 details the Cronbach's Alpha values for each construct of the generated questionnaire.

Table 2: Cronbach's Alpha values

Components	Number of Items	Cronbach's Alpha value
General Knowledge of E-portfolio	5	0.937
Perceptions on the Use of E-portfolio in ASK subjects	11	0.945
E-portfolio Usage Software Recommendations	6	0.853
Average	**22**	**0.912**

Statistical Package For Social Science (SPSS) version 25.0 software was used to analyze the study data describing the data in frequency, standard deviation, and mean. Next, descriptive analysis was performed based on the interpretation of the mean score proposed by Ghazali and Sufean (2016), as shown in Table 3.

Table 3: Interpretation of Mean Scores

Mean Score	Interpretation
1.00 to 2.00	Low
2.01 to 3.00	Medium-Low
3.01 to 4.00	Medium-High
4.01 to 5.00	High

Resources: Ghazali & Sufean (2016)

RESEARCH FINDINGS

Demographic Analysis of Study Respondents

Table 4 shows the results of the analysis of ASK Teacher Profiles by gender, age, and experience teaching *Asas Sains Komputer* subjects. A total of 90 respondents answered the questionnaire distributed online.

Table 4: Respondent Demographics Analysis

Aspects	Description	Frequency (n)	Percent (%)
Gender	Male	25	27.8
	Female	65	72.2
	Total	**90**	**100**
Age	21 - 30 years	6	6.7
	31 - 40 years	47	52.2
	41 - 50 years	33	36.7
	50 years and above	4	4.4
	Total	**90**	**100**
ASK Teaching Experience	< 1 years	6	6.7
	1 - 2 years	8	8.9
	3 - 4 years	58	64.4
	> 5 years	18	20.0
	Total	**90**	**100**

Table 5 displays the analysis of 90 respondents, consisting of 65 female respondents (72.2%) and the remaining 25 male respondents or represented by 27.8%. The findings also showed that 47 (52.2%) people out of 90 respondents were aged 31-40 years, 33 respondents (36.7%) were aged 41-50, 4 respondents (6.7%) were aged 21-30 years, and four respondents (4.4%)) aged 50 years and above. While from experience teaching the subject of *Asas Sains Komputer*, the study results showed that 64.4% (n = 58) of respondents have teaching experience for 3-4 years. In addition, the findings also show that 18 respondents (20.0%) have experience teaching ASK subjects for more than five years. The remaining eight respondents (8.8%) have experience teaching ASK subjects for 1-2 years, while six (6.7%) have experience teaching ASK subjects for less than one year.

Teachers' general knowledge of E-portfolio

There are five items to identify teachers' general knowledge of using E-portfolio. Table 6 displays the results of descriptive statistics on 90 respondents on general knowledge of E-portfolio.

Table 6: Mean score of general knowledge of E-portfolio

Code	Items	Mean	Standard Deviation	Interpretation
A1.	Keeper of pupil learning records	4.14	0.68	High
A2.	Process of selection of the best work results	3.97	0.80	Medium-High
A3.	Pupil Learning Assessment	4.06	0.71	High
A4.	Professional development	3.96	0.73	Medium-High
A5.	Documenting the results of work	4.17	0.72	High
	Average	**4.06**	**0.73**	**High**

The findings showed that the overall mean value was 4.06 (sd = 0.73) was at a high level of mean interpretation. Analysis of each item found that two items recorded moderately high mean scores. The items were A2 (mean = 3.97 and sd = 0.80) and A4 (mean = 3.96 and sd = 0.73). The remaining three items recorded high mean scores namely A1 (mean 4.14 and sd = 0.68), A3 (mean = 4.06 and sd = 0.71) and A5 (mean = 4.17 and sd = 0.72).

Perceptions of teachers regarding the usage of E-portfolios in ASK

Table 7: Mean Score of teachers' perceptions on the use of E-portfolio in ASK subjects.

Code	Items	Mean	Standard Deviation	Interpretation
B1.	It could be an alternative assessment tool for 21st-century learning to traditional assessment	4.20	0.64	High
B2.	The use of an E-portfolio is flexible	4.17	0.57	High
B3.	The use of highly interactive E-portfolios in teaching and learning	4.14	0.61	High
B4.	It may help improve the method of using different creative tools in the assessment	4.20	0.55	High
B5.	Suitable mobile technology used in PBD	4.16	0.62	High
B6.	Able to make a proper assessment of students' learning	4.17	0.62	High
B7.	Able to increase pupils' creativity	4.10	0.69	High
B8.	Able to improve pupils' high-level thinking skills	4.10	0.60	High
B9.	It can help the process of storing students' work more systematically	4.29	0.60	High
B10.	Able to monitor students' work	4.23	0.62	High
B11.	Able to open up the opportunity to use technology in the classroom	4.21	0.68	High
	Average	**4.18**	**0.62**	**High**

Based on Table 7 displays a descriptive analysis of teachers' perceptions of the use of E-portfolio in ASK subjects. The mean score for the teacher perception construct was 4.18 (sd = 0.62), indicating a high mean interpretation. The results indicate that item B9 has a mean of 4.29 and a standard deviation of 0.60. The result explains that respondents agreed that E-portfolio is suitable for implementation in ASK subjects as a tool to document student work results systematically. While items B7 (sd = 0.69) and B8 (sd = 0.60) each have the same mean score value of 4.10. These findings show that the respondents agree that using E-portfolio in ASK subjects is relevant and can increase students' creativity and high-level thinking skills if its use is optimized as much as possible.

E-portfolio software recommendations

Table 8: Software Recommendations for E-portfolio

Code	Items	Mean	Standard Deviation	Interpretation
C1.	Blog	3.39	1.11	Medium-High
C2.	Mahara	2.97	1.04	Medium-Low
C3.	Wikis	3.00	1.07	Medium-High
C4.	Google Classroom	4.24	0.71	High
C5.	Edmodo	3.18	1.03	Medium-High
C6.	Facebook	3.36	1.08	Medium-High
	Average	**3.36**	**1.01**	**Medium-High**

The analysis findings showed that respondents agreed that Google Classroom was the main platform proposal for using E-portfolio in ASK subjects, with a mean score of 4.24 (sd = 0.71). Respondents also agreed that Blog (mean = 3.39 and sd = 1.11) could also be used as an E-portfolio platform for ASK subjects. Based on Table 8, the mean score interpretation shows that the respondents' agreement with the software proposal to use E-portfolio is at a medium to high mean interpretation with a mean score value of 3.36 and a standard deviation of 1.01.

DISCUSSIONS

Technological advances and appropriate tools can produce online learning more effectively and address the lack of traditional learning. Based on the theory of online collaborative learning (OCL), Harasim (2017) has presented three main phases to building knowledge in OCL: idea generation, idea organization, and intellectual concentration. This indirectly contributes to teaching and learning activities to create knowledge. At the same time, the use of web-based tools can diversify traditional learning in the form of static. Robinson, Kilgore, and Warren (2017) stressed that to produce quality online learning; teachers must have a strong understanding, improve teaching pedagogy skills and require detailed planning and preparation for online learning to be more effective and meaningful. This statement was supported by the results of a study, which indicated that effective student learning and instructor instruction depend greatly on the user's knowledge and proficiency with E-portfolio software.

Using E-portfolios that integrate technology in teaching and learning requires effective planning, procedures, knowledge, skills, and training. If the findings for the knowledge aspect of E-portfolio are highlighted, it can be concluded that the level of knowledge about E-portfolio among teachers is low. This is because E-portfolios are still a relatively new trend in developing countries (Mpho-Entle and Patience, 2021), and teachers have not yet been exposed to the widespread use of E-portfolios. Therefore, using E-portfolio requires a detailed framework and model to meet the needs of the education system (Tajul Ashikin, Ruhizan, & Rohani, 2015).

Overall, the results indicate a positive perception among teachers towards using E-portfolio in ASK. They showed a positive response to implementing E-portfolio in teaching and learning. Findings show that apart from the E-portfolio can document students' work more systematically, teachers also think that the E-portfolio can be used as an alternative assessment tool to traditional assessment. Besides, an E-portfolio-based assessment acts as a useful reflection tool. (Hsu, 2020; Kwok & Hui, 2018), Education supports collaborative and self-directed learning (Tur, Urbina, & Forteza, 2019). Especially in Malaysia, this is an encouraging sign for implementing E-portfolios as an assessment tool in schools.

Based on the study results, Google Classroom is the main choice of teachers as one of the platforms for implementing E-portfolio at the school level. It is common knowledge that Google Classroom helps implement the virtual learning process from the aspect of creating, distributing, and grading student assignments more easily and meaningfully (Swita & Heri, 2019; Sukmawati, 2020). Just the Ministry of Education Malaysia's initiative to introduce Google Classroom as a virtual learning platform at the school level in 2019 has been synonymous with teachers. However, teachers need to be given exposure and skills to use other software in implementing E-portfolios. At the same time, the need for teachers for advanced training in using various ICT tools and software to make the process of student assessment more systematic (Vorotnykova and Zakhar, (2021). This can indirectly create a diversity of teaching methods and student assessment while strengthening the process of building teachers 'knowledge and skills in virtual learning.

CONCLUSION AND RECOMMENDATION

E-portfolios as a digital assessment tool are an alternative approach that can be used to assess students in the classroom. Based on the findings in this study, *Google Classroom* is one of the platforms for implementing an E-portfolio at the school level. It is possible to suggest that the implementation of E-portfolios in ASK subjects should be expanded and introduced. It is supported by the study's findings showing that teachers' knowledge and perceptions of using E-portfolio as a digital assessment tool are at a high level. Teachers have a high knowledge and perception of the use of E-portfolio. However, they are still less exposed to the appropriate software or platform to implement E-portfolio based on the level of meaningful interpretation of E-portfolio software recommendations at a moderately high level. It is recommended that future studies conduct more significant studies to design and build a module, model, prototype, or E-portfolio system so teachers would use digital assessment more efficiently.

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