

Authentic Assessment Practices of Geography Teachers in the Online Education

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ABSTRACT

This study aimed to determine the professional duty of Malaysian geography teachers to integrate authentic assessment into the teaching and learning process. Questionnaires were distributed online to 379 geography teachers at the secondary school level by a simple online snowball distribution method. Descriptive and ANOVA analyses were used to address each research question. The study's findings revealed that most teachers continued to assess their students using conventional methods. However, online assessment methods were also used in a small percentage of cases. Each variable possessed high knowledge, skills, and professional responsibility practice. Analysis of the relationship between the study variables and teachers' work experience indicated significant differences. In conclusion, the knowledge, skills, and professional responsibility practices associated with authentic assessment implementation were high during the teaching and learning process, and certain online assessment types were under-utilised. The study suggests that the Malaysian Ministry of Education should develop strategies and

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provide training to enhance the utilisation of various online assessment platforms..

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Introduction

The educational system's success is crucial to Malaysia's prosperity and progress. Furthermore, education is critical in facilitating the transition to the global world of the twenty-first century by producing high-quality human capital that is knowledgeable, rational, and noble. The implemented curriculum focuses on three key dimensions to ensure the success of these efforts: writing (which includes the knowledge students acquire, the skills they develop, and the values they apply); knowledge assessment (evaluating knowledge, skills and values through summative and formative exams); and resource-based room assessment (Ministry of Education Malaysia, 2013). As a result of the assessment, teachers directly determine the growth of students' knowledge, abilities, values, attitudes and accomplishments.

Assessment is vital because it is designed to help students improve their learning, not to label and compare them (Ministry of Education Malaysia, 2015). Assessment is a method used during the teaching and learning (T&L) process to increase the quality of assessment or judgement made during the T&L process (Hanifah et al., 2017). This is because assessment assists students by identifying their strengths and weaknesses and then reflecting on their learning using the assessment results (Oo et al., 2021). Assessment is essential for teachers to determine students' comprehension levels and refine their teaching style (Singh, 2022). An

authentic assessment is an appropriate evaluation in the online T&L process. When the Malaysian government announced a Movement Control Order (MCO) to stop the spread of COVID-19, online learning techniques became essential for teachers and students. Teachers must work from home throughout the implementation of the MCO to ensure continued access to T&L.

Teachers and students extended T&L online following the implementation of the MCO. Teachers could use a variety of online platforms as well as appropriate social media to plan and give instructions, assignments, and homework for each student during the MCO period. As a result, an authentic assessment method is possible. Authentic assessment is a formative assessment that occurs consistently and can occur within or outside the classroom. Moreover, online assessments can be used to determine students' levels of achievement (Nor Fauzianah, 2020). Online assessment is much easier to implement when existing applications such as Kahoot, Quizziz, Google Forms and video presentations are used (Khalima et al., 2022; Natasya, 2020). Rubrics allow teachers to assess and measure students' achievement levels. The implementation of this study will directly involve the knowledge (cognitive), skills (psychomotor) and practice of the professional responsibilities of geography teachers in authentic assessment of the T&L process.

There are few studies on implementing authentic assessment in education, and most focus

on how authentic assessment identifies students' cognitive, affective and psychomotor levels during the physical T&L process. A study by Nugraheni (2021) showed the teachers' abilities to apply authentic assessment during learning, focusing on three indicators: *planning an authentic assessment, implementing an authentic assessment, and analysing the assessment result*. This study also affects the practice of professional responsibility among geography teachers. A survey by Munandar et al. (2020) that focused on the professionalism of geography teachers through an authentic assessment field study showed that it helped improve teachers' personalities and social competencies. This is due to valuable feedback on their teaching effectiveness that helps to identify areas to adapt their teaching style. However, pedagogical and professional competencies were lacking among geography teachers in field activities. Hence, the current study has focused on three key factors: *cognitive, psychomotor, and teacher methods* to improve their professional practice in authentic assessment during the online T&L process.

As a result, this study is grounded in constructivism. There is much potential to boost student involvement both within and outside the classroom, whether online or through mobile technology apps, regardless of time or place, according to the implementation review via Web 2.0 applications (Ahmad Fkruddin et al., 2019). Teachers must also be creative in selecting appropriate assessment methods (Abdul Halim, 2021). This method is suitable for authentic assessment and online T&L, as today's students are Generation Z members, and most are familiar with Web 2.0 applications. Authentic assessment is well suited to online learning because it incorporates a variety of instruments and methods that students can apply during the authentic assessment process.

Although the Ministry of Education Malaysia allows teachers to conduct and choose authentic assessments with various formative assessments, most teachers still lack the skills to implement authentic assessments during online T&L. Hanifah (2021) revealed that even though the teachers had followed a course to prepare online assessments, they still lacked confidence in assessing their students. This situation is due to a lack of knowledge, skills, and materials, which influenced their confidence in preparing for the assessment (Norzeliana, 2016). Hadijah and Shalawati (2017) stated that teachers face obstacles due to insufficient time to prepare lessons using technology.

Authentic Assessment Knowledge

Authentic assessment is conducted on students while they are engaged in activities and tasks relevant to their real-world situations. It can be performed through various methods, including a performance review, a portfolio, a project assignment, and self-evaluation (Winarso, 2018). Additionally, genuine assessment is a kind of evaluation where students must finish practical assignments that show how to apply core knowledge and abilities (Hanifah et al., 2021). Moreover, it is a technique that replaces traditional assessment methods that rely on equipment such as pencil and paper. This assessment reformation supports evaluating collaborative problem-solving abilities, self-evaluation, practice based on real-life scenarios, and sophisticated thinking abilities at work (Sri-gran et al., 2024). It gives students space and opportunities to express themselves through teacher assignments. In the framework of global educational reforms, authentic assessment is essential for influencing curriculum and instructional changes that promote the social components of active learning. It helps students reflect more deeply on

themselves and enables them to achieve genuine and beneficial effects and teamwork (Ukashatu et al., 2021). In addition, the modified assessment helps mold outstanding educators to provide more engaging and student-focused assessments (Muhammad Noor et al., 2020). This is because experienced teachers need more knowledge of authentic assessment, which results in them not applying it in their T&L process to assess their students. The shift to authentic assessment benefits curriculum creation, student development activities, community development initiatives, training needs, and institutional development (Aziyati & Irdyanti, 2022). Thus, implementing authentic assessment in education played a huge role in reforming the education system to align with twenty-first-century learning, especially in geography.

Assessment Method Skill

Teachers should apply knowledge, skills and experience based on performance standards when implementing assessment skills, which are aspects considered by their professional judgement (Masfarizan & Mohammed Yusof, 2020). A high level of readiness for direct assessment enables teachers to make necessary adjustments to enhance the quality of their T&L (Fakhri & Mohd Isha, 2016). Thus, they should be proficient in all the areas mentioned earlier to ensure that T&L is effective in improving assessment quality. Implementing online assessment requires teachers to have professional teaching, learning, and assessment skills. They must be adept at time management and lesson planning so that each lesson runs smoothly and achieves the targeted objectives. Furthermore, they must be skilled at conducting assessments outlined by the Malaysian Examinations Board.

The findings of Nordin and Ismail (2014) indicated that assessment or evaluation could help students learn and enrich learning when the form and content of the assessment or evaluation are modified to reflect the critical nature of improved thinking and problem-solving skills in each discipline. Educators can also utilize multiple methods for classroom assessment (Alkharusi et al., 2021). Malaysia's Education Development Plan (PPPM) 2013–2015 aimed to focus on higher-order thinking skills (HOTS) (Ministry of Education Malaysia, 2013). Examinations and assessments have been redesigned to emphasise HOTS to improve educational quality. The effectiveness of assessment practices is one of the factors influencing students' ability in HOTS (Razmawaty & Othman, 2021). Assessment practices encompass the format of assessments, the items used, questioning techniques, and scoring rubrics. Therefore, teachers' skills are crucial in implementing appropriate assessment methods to help students improve their HOTS abilities.

Assessment Skill

A teacher's assessment skill refers to the ability to design, administer and interpret various assessments to accurately measure students' learning, providing valuable feedback to inform instruction and guide students' progress while understanding the limitations and appropriate uses of different assessment methods. A study by Ullah (2023) stated that to assess student learning in the classroom and improve academic performance, teachers need to be knowledgeable about assessment techniques and skills. Kapur (2014) stated that teachers possess the skills and abilities to identify their students' weaknesses and formulate measures to improve them through assessment. Based on an evaluation of their skills, teachers'

improvement in their professional growth can be measured to produce not only the best students but also highly skilled teachers. Guevarra et al. (2024) stated that teachers who are proficient in grading and assessment ethics rely on assessment tools and techniques that help to develop their assessment abilities because they are more eager to learn, seek assistance and modify their teaching setup. This is important, as teachers mainly depended on their gadgets to communicate with their students during the lockdown to ensure the T&L was carried out so their students did not feel left behind in their studies. Teachers who lack the skill to implement authentic assessment during online T&L undergo teacher training. This training helps prepare teachers' professional knowledge and ability, ethics, and practice assessment appropriately (Leong, 2015). Therefore, the ability of teachers to manage assessments, particularly during online T&L, is crucial to increasing students' interest and academic success. To boost their professionalism, it is also critical to ensure that all teachers are adaptable when instructing their students in person or virtually, even during COVID-19. Given how important teachers are to students' academic and personal growth, this study was driven by the desire to better understand and advance teachers' professionalism in the context of twenty-first-century learning. This is due to teachers' focus on encouraging continuous learning, embracing technology integration, developing skills, developing student-centered learning approaches, and adapting to the trends in the digital age. The study's primary purpose is to investigate teachers' efficacy in addressing the demands of modern education, influenced by their professional values as outlined in the Malaysian Teacher Standard (SGM). This study intends to add to the continuing conversation about enhancing teachers' professionalism and,

consequently, the general standard of education in Malaysia by combining insights from the literature.

Practice of Professional Responsibility

Teachers' professionalism is valued in ways other than through the T&L process. Indeed, a professional teacher can put into practice the diverse professional skills acquired during his or her time in a professional programme. The national education system has been altered to meet the needs of the current educational system, particularly in terms of teacher's professionalism and the implementation of twenty-first-century T&L.

The Philosophy of Teacher Education (FPK), introduced in 1982, extends the National Philosophy of Education that focuses on noble, progressive and scientific characteristics (Al-Hudawi, 2014). Moreover, teachers must be dedicated to elevating the national goals and embracing the national culture to facilitate each student's development and uphold unity, democracy and orderly communities. Teachers also serve as their students' planners, managers, facilitators, mentors and role models. As a result, the SGM included several domains under the Professional Values Practice Standards, including the self, professional and social domains (Ministry of Education Malaysia, 2019).

The literature study emphasizes forming the educational environment, especially regarding T&L in the twenty-first century. Beyond the T&L process, professionalism includes teachers using the skills they have learned through professional training. Royce et al. (2021) stated that a teacher's professional practice helps shape students to become more familiar with real-world situations. This is due to authentic

assessment that allows all students to evaluate themselves emotionally and professionally. Authentic assessment has also nurtured students to emphasise realism within themselves and contribute to social good (Nieminen et al., 2024). Being able to help students shape the social aspect within themselves is a great achievement for a teacher who wants to improve their professional responsibility practice. Teachers are willing to undergo training to strengthen their professional responsibility practices and obtain more knowledge to ensure they can handle the new type of evaluation that benefits their students (Ahmed et al., 2021). The evolution of the national education system reflects an increasing emphasis on teachers' professionalism, aligning with the demands of modern education. Based on the National Philosophy of Education, the Philosophy of Teacher Education strongly focuses on developing teachers' virtuous, forward-thinking, and scientific traits (Ministry of Education Malaysia, 2019).

Therefore, regarding the pivotal role of teachers in students' personal and academic development, this study is motivated by the need to explore further and enhance teachers' professionalism within the framework of twenty-first-century education. This study aims to investigate how teachers' efficacy in addressing the demands of modern education is influenced by their professional values, as outlined in the SGM. By combining insights from the literature, this study intends to add to the continuing conversation about enhancing teachers' professionalism and, consequently, the general standard of education in Malaysia.

Purposes of the Research

This study was conducted to ascertain geography teachers' professional responsibility practices

when implementing authentic assessment during their online T&L process. This study included the following objectives:

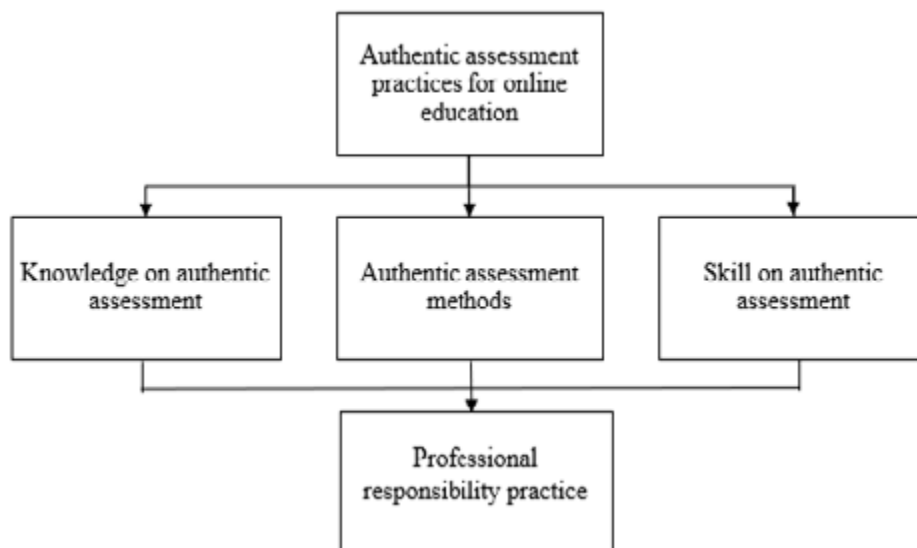
1. To identify authentic assessment methods implemented by geography teachers in the T&L process.
2. To examine geography teachers' levels of knowledge, skill and professional responsibility practices in authentic assessment.
3. To examine teachers' differences in knowledge, skills, and methods for implementing authentic assessments.

Conceptual Framework

Figure 1 (conceptual framework) illustrates the key variables of the study, which include *knowledge (cognitive)*, *methods*, and *skills (psychomotor)* applied by geography teachers to practise authentic assessment for online learning. Teachers' proficiency in using authentic assessment to allow them greater latitude to showcase their skills is determined by the first crucial variable: their understanding of authentic assessment. This situation also helps teachers create higher-order cognitive and practical skills to produce divergent students (Wahyuni et al., 2020). Secondly, authentic assessment is critical to gauge how well students apply their knowledge and skills in everyday situations (Sewagegn & Diale, 2020). To achieve this, most geography teachers changed traditional assessments based on paper and pencil to online assessments such as Kahoot, Quizizz, Mentimeter and many more in their teaching and learning process. Most experienced teachers in the educational field for more than 25 years preferred the traditional assessment based on paper and pencil; however,

Figure 1

Framework of the Study



if they learn to adopt this method in their teaching and learning process, less paper is used, and students will be more familiar with using technologies during the assessment. Furthermore, the students were motivated to sit for an assessment as it was more exciting than traditional assessment.

Lastly, regarding authentic assessment (psychomotor), teachers' skills in implementing authentic assessment prove that teachers are professionally trained in their pedagogy knowledge and skills that align with the assessment practices (Muhammad Noor et al., 2020). For example, a study by Nugraheni (2021) stated that geography professors are adept at using realistic assessments in their online teaching and learning process. One such assessment was having students create a video. Based on this assessment, teachers' knowledge and skills are improved as they gain new experiences to evaluate their students online and

improve their skills, especially in technology. In this example, authentic assessment helps them apply their knowledge, which sharpens their skills and allows them to use them in real-world scenarios due to the assessment method teachers have planned for their lessons, which are focused on simulations and hands-on tasks (Cassilas et al., 2019). Thus, the students will be more prepared to work in a working environment as they have been trained in school and are focused on their knowledge and skills in social life, handling work, and handling stress.

The key variables are grounded in constructivism, which serves as the guiding principle for the study. Constructivism supports a learning approach where the roles of teachers and students are balanced, fostering a collaborative learning environment. In this context, the practitioner of constructivism, the teacher, acts as both a guide and a facilitator, recognising and accommodating the diverse

behavioural characteristics of students. This helps the teachers select appropriate methods for concept acquisition and knowledge application, which are integral to teaching and assessment. By leveraging constructivism, the study explores how geography teachers can effectively implement authentic assessments in online learning through three key variables that improve their professional responsibility practice. Therefore, under the National Education Philosophy, the authentic assessment also moulds students to meet the standards of students in the twenty-first century and become professionals in their work field, professional upholsterers in the future.

Methodology

Research Design

This survey research covered a wide geographic area with a sizable study population. A questionnaire served as the research tool in the quantitative study design. This survey study collected data on variables related to teachers' professional responsibility for authentic assessment during the online T&L process, such as knowledge, skills, and methods. The questionnaires were distributed online to geography teachers throughout Malaysia.

Population and Sampling

The study population consisted of Malaysian secondary school geography teachers. This was critical because the goal of sampling is population determination. According to Public Sector Open Data, the Ministry of Malaysia had 24,945 geography teachers in 2020. The sample size was determined by Krejcie and Morgan's (1970) table. Their record for determining

sample size states that 379 responses were selected from 24,945 respondents. A simple online snowball distribution method was used to select 379 geography teachers in Malaysia. Only teachers who teach geography were allowed to answer these questionnaires; teachers who majored in geography but were not teaching this subject in school were not permitted to respond. This method was chosen since schools were forced to close due to the COVID-19 lockdown pandemic, shifting all traditional assessments to authentic assessments to evaluate students even though they were not at school. The period of online data gathering was March–April 2021. By implementing this authentic assessment, students' cognitive and psychomotor skills are measured despite being far from the school. The snowball distribution method ensured that the questionnaires reached the target participants: respondents who taught geography helped distribute the Google Form link to other teachers through a telegram group and the head of the geography department in each school. Through this method, the questionnaire reached the target group of geography teachers.

Respondent Profile

The study identified 379 geography teachers from Malaysian secondary schools (Table 1). This study focused on teachers teaching geography and handling authentic assessments during online T&L during the lockdown session. The study's respondents came from all of Malaysia's states, and there was no state designation because the questionnaires were distributed online through the teachers' portal and geography's teacher's telegram groups. Respondents' locations were divided into two, as the schools in Malaysia comprised urban and rural schools, according to the state of Malaysia. The school's location influenced the internet

access implemented in the authentic assessment during the online T&L. The teachers' age was divided into four different groups (Less than 30 years old, 31-40 years old, 41-50 years old and more than 51 years old) to show various teaching experiences among novice teachers and experienced teachers in implementing the authentic assessment during the online T&L. The respondents' gender was divided into two groups, male and female, to see the tendency among these genders to implement authentic assessments; meanwhile, the highest

educational level was to show the highest academic level of geography teachers in school.

Instruments

The questionnaires were developed based on the large sample size of an evaluation study. The questionnaires were divided into five sections: A, B, C, D, and E. Sections C, D, and E used a five-level Likert scale method: the five levels were used to assess respondents' agreement, 1 indicating 'disagree' and 5 indicating 'strongly

Table 1

Frequency Distribution of Respondents' Profile

Variables		Frequency	Percentage (%)
School location	Urban	185	48.8
	Suburban	194	51.2
	Total	379	100.0
Age	Less than 30 years old	52	13.7
	31-40 years old	127	33.5
	41-50 years old	95	25.1
	More than 51 years old	105	27.7
	Total	379	100.0
Gender	Male	142	37.5
	Female	237	62.5
	Total	379	100.0
Race	Malay	287	75.7
	Chinese	34	9.0
	Indian	20	5.3
	Sarawak's Bumiputera	4	1.1
	Sabah's Bumiputera	34	9.0
	Total	379	100.0
Highest level of education	Diploma	0	0
	Bachelor's degree	334	88.1
	Master's degree	45	11.9
	Doctorate (PhD)	0	0
	Total	379	100.0
Teaching experience	Less than 5 years	81	21.4
	6-10 years	60	15.8
	11-15 years	32	8.4
	16-20 years	39	10.3
	More than 21 years	167	44.1
	Total	379	100.0

Table 2

Respondents Questionnaire Information

Part	Constructs	Details	Number of items	Alpha Cronbach Value
A	Respondents' Background	Items such as School location, age, gender, race, level of education, and teaching experience.	7	-
B	Authentic assessment methods	List of items on assessment method.	12	-
C	Knowledge of authentic assessment	Knowledge of teacher assessment during T&L	9	.859
D	Skill in authentic assessment	Skills in performing assessments	9	.824
E	Professional responsibility practice	The implementation of assessment involves professional practice and social practice	17	.838

agree'. The researcher constructed all items for each variable according to the study's context. Before the pilot study, expert validation and face validity were completed. Expert validation was the initial process after the items were built. Three experts were given the responsibility to evaluate each developed item. Expert 1 specialised in education geography at Universiti Malaysia Sabah; Expert 2 specialised in human geography at Sultan Idris University of Education; and Expert 3 was a geography teacher in the Muallim district. All the expert comments were analysed verbatim, and each comment was evaluated for the items. In this study, no items were dropped, though items were revised and refined in terms of meaning.

A pilot study was conducted on a subset of respondents who were not part of the study sample but were population members. Respondents for the pilot study were 30 geography teachers who teach in the Muallim district, Perak. The questionnaire was distributed only to respondents in this district. An acceptable reliability coefficient exceeds 0.6 (Hair et al., 2003). Cronbach's alpha values ranging between

.7 and .8 were considered sufficient. However, items in Part A (Respondents' Background) and Part B (Authentic assessment methods) were not analysed for Cronbach's alpha values because the items were not in the form of a Likert scale (refer Table 2).

Data Analysis

SPSS software was used to analyse the descriptive data and inferential statistics. The number and percentage of respondents' profiles (geography teachers implementing authentic assessment practices during online T&L) were examined using descriptive analysis. In addition, respondents answered questions about their professional responsibility practices and their level of knowledge and proficiency in authentic assessment. To ascertain the value level for each variable and address the investigations' goals, the scale developed by Best (1997) was applied in this study. This scale states that a score between 1.00 and 2.33 indicates low attribute data; a score ranging from 2.34 to 3.66 indicates an average attribute level; and a score of 3.67 to 5.00 indicates high attribute data. Analysis of variance

(ANOVA) was used to prove the difference in knowledge, skills and authentic assessment practices based on teachers' teaching experience.

Ethical Considerations

According to the study ethics rules issued by the Universiti Pendidikan Sultan Idris's Ethics Committee, any studies conducted by researchers, lecturers or students must, in theory, get ethical approval and consent to participate. Every aspect of this study involving human subjects was carried out according to the institutional research committee's ethical requirements. Additionally, each study participant consented to participate in the research.

Results and Discussion

Authentic Assessments Implemented by Geography Teachers

To address the study's objective of identifying authentic assessment methods used by teachers during the T&L process, 12 authentic assessment methods that respondents could use for T&L assessment were listed during the MCO period. These were examples of what teachers could use, particularly those teaching geography. Quizziz, Padlet, Kahoot, Google Site, Plickers, Google Classroom, modules, mind maps, drawings and scrapbooks were among the techniques used. This approach gives students the chance to apply their information in relevant and contextualised ways that foster problem-solving, creativity, critical thinking and teamwork (Wang & Tahir, 2020). Students can think critically about the material through quick, interactive questions and simulate real-life situations, as students need to make quick decisions and reflect on the consequences of their decisions.

Descriptive analysis was used to analyse the dichotomous questionnaires. Dichotomous questions are accessible and simplify the survey experience. Teachers only answered 'yes' or 'no' to the assessment method they implemented in their online classes. Based on the data, the most used assessment methods applied by teachers in their online T&L are modules (93.1%) and mind maps (88.7%); the least favoured by teachers to implement in their T&L is Plickers (12.9%). This is because engagement between teachers and students existed even though the T&L process was online, and the preferred methods also helped to encourage students to simplify the complex concepts of T&L. The result aligns with the researchers' expectations, as most teachers used Google Classroom and Mind Maps to cope with online learning when the school was shut down due to COVID-19. A study by Iftakhar (2016) stated that because Google Classroom allows teachers to send assignments, offer content and monitor students' attendance, it helps keep courses organised and enhances student communication.

Google Classroom identified students struggling with assignments and keeping their files organised (Hidayat, 2021). A study by Shana et al. (2021) stated that Google Classroom is easy to use as it is paperless, user-friendly and allows collaborative learning to succeed online. Google Classroom was free, and the teachers' and students' use of technology with timeless communication improved during the online T&L (Sudarsana et al., 2019). Educators view Google Classroom as a valuable online learning platform that meets the evolving requirements of both students and teachers in the classroom during and after the COVID-19 lockdown (Martin, 2021). The mind map learning approach during online learning improves students' performance as it helps to organise lessons and concepts

Table 3

Authentic Assessment Methods by Geography Teachers

Assessment Method	Number of Respondents (N)	Percentage (%)	Not Used by Respondents (N)	Percentage Not Used (%)
Quizzes	257	67.8	122	32.2
Google Classroom	310	81.8	69	18.2
Modules	353	93.1	26	6.9
Drawings	233	61.5	146	38.5
Mind Maps	336	88.7	43	11.3
Scrapbooks	237	62.5	142	37.5
Padlet	111	29	271	71
Kahoot	176	39.1	230	60.9
Google Site	188	49.6	191	50.4
Plicker	49	12.9	330	87.1
Quizlet	138	36.4	241	63.6

meaningfully because of the active learning technique (Nyagblormase et al., 2021). A mind map improves subject matter recall by allowing hierarchies and associations to flow freely and coherently from a central image (Arulselvi, 2017). A study by Winata and Rahmat (2021) revealed that learners using digital mind-mapping learning models had higher scores in creativity. In addition, mind maps enhance students' soft skills and critical thinking abilities, allowing them to examine variations in their learning experiences and preferences (Alsuraihi, 2022). Enhancing students' soft skills and essential thinking abilities contributes to advancing innovation and growth in education.

The trend of this result (Table 3) suggests that geography teachers prefer well-established and versatile digital tools like Modules, Google Classroom and Mind Maps for authentic assessment, reflecting a strong inclination towards tools that support structured and interactive learning. On the other hand, available tools like Plickers, Padlet and Quizlet saw limited

adoption, possibly due to a lack of familiarity or perceived relevance to the subject matter. The study's findings of authentic assessment methods used by teachers during the T&L process revealed that most respondents were still unfamiliar with most of the authentic assessment methods listed in this study. The analysis showed that geography teachers most frequently used Google Classroom and Mind Maps in the module evaluation process, with over 80percent of respondents utilising these methods. Malaysia used Google Classroom as an online T&L medium during the MCO period, which put it ahead of developed countries when online T&L implementation began in 2020 (Nurhidayah, 2020).

This result demonstrates the considerable impact and proficiency of teachers and learners in Malaysia who utilise software as a teaching tool. It helped teachers used to teaching students face-to-face adapt to online teaching. Moreover, the effect of online T&L due to the COVID-19 lockdown provided by the educational institutions allowed trained teachers

to improve themselves in handling authentic assessments (Phillipakos, 2022). The knowledge they received from the training, incorporated chiefly through information communication and technology (ICT), can also be applied in today's T&L process (Eickelmann & Drossel, 2020). Through their peer networks, teachers accustomed to using ICT in their T&L sessions are better equipped to get up-to-date information about developments in their pedagogical use of ICT. Drossel et al. (2017) stated that since they already collaborate and communicate with peers online, teachers were more inclined to embrace cutting-edge technology and surpass the challenges while using ICT. Therefore, teachers who actively use ICT in their T&L to collaborate with peers are better equipped for distance learning (Huang et al., 2023). Thus, through this implementation of authentic assessment, the teachers' profession increases its value in teacher education as teachers are willing to change their assessment method.

Level of Knowledge, Skill and Practices for Authentic Assessment among Geography Teachers

The analysis of geography teachers' knowledge and skills regarding professional responsibility in performing authentic assessments during the T&L process is shown in Table 4. The data trends of the mean for the profession domain (2.973) and social domain (2.838) are at a moderate level under the professional responsibility construct, the standard deviation for the two items being 0.160 and 0.373. However, the knowledge and skill constructs showed high mean levels of 4.163 and 4.162, respectively. The standard deviations for each item are 0.622 and 0.507, respectively. Thus, the data show that the mean value does not directly affect the size of the standard deviation. For example, the highest mean value of the construct is 4.177 (professional responsibility

practice); meanwhile, the standard deviation was not the highest among the three constructs. Therefore, based on these five constructs, namely knowledge, skill, professional responsibility practice, profession domain and social domain, teachers' knowledge was essential to implement the authentic assessment as it was recorded as having the highest standard deviation.

The level of knowledge of authentic assessment among geography teachers is vital, as they need to know the types of authentic assessment suited to their student's learning styles. A study by Asante (2023) stated that teachers need a high level of knowledge to implement authentic assessments and promote higher thinking skills among students. A high level of knowledge among teachers also helped prepare numerous creative variations of authentic assessment, including paralogy, to help assist and move students' learning to a higher level. Teachers' authentic assessment skills were high, with a standard deviation of 0.507, indicating the ability to create and carry out assessments that support students in effectively using their knowledge and skills. For instance, teachers could determine their pupils' cognitive level by creating a learning module: incorporating HOTS into a module's design encourages students to think critically, solve problems and engage in metacognition (Hamidah et al., 2023).

Modules usually involve open-ended questions and scenarios that require students to think creatively and provide innovative solutions essential in real-life situations. Better student results will arise from teachers' increased proficiency in applying the various evaluation strategies (Christoforidou, 2014). Effective assessment procedures can be encouraged through teacher professional development programmes, as evidenced by the finding that

Table 4

Level of Knowledge, Skills, and Professional Responsibility Practice Variables in Geography Teachers' Teaching Experiences

Construct	Low Level		Moderate Level		High Level		Mean	Standard Deviation (SD)	Mean Level
	N	%	N	%	N	%			
Knowledge	6	1.6	48	12.7	325	85.8	4.163	0.622	High
Skill	0	0.0	52	12.7	327	86.3	4.162	0.507	High
Professional responsibility practice	0	0.0	23	6.1	356	93.9	4.177	0.324	High
▪ Profession Domain	0	0	10	2.6	369	97.4	2.973	0.160	Moderate
▪ Social Domain	0	0	63	16.6	316	83.4	2.838	0.373	Moderate

Mean range (verbal interpretation): 3.67-5.00 (high mean level); 2.34-3.66 (medium mean level); 1.00-2.33 (low mean level)

teachers' assessment abilities are connected to students' achievement. Based on professional responsibility, authentic assessment helps promote teachers' critical reflection skills that help them improve themselves in preparing for authentic assessment (Ketonen et al., 2023). Critical reflection skills are divided into the professional domain and the social domain. For the professional domain, an authentic assessment developed the values of citizenship. The teaching of values and morals is inseparable from the wider education field.

Therefore, implementing authentic assessment requires cognitive skills and moral values among students (Masnida et al., 2021). Implementing moral values within students showed that teachers were responsible and respected professional practice as they sought to fulfil and demonstrate moral responsibility while achieving their professional goals. According to the social domain, teachers and students interact more when dynamic communication and involvement influence respect for one another (Coristine et al., 2022). As a result, students gain confidence and recognition of self-worth, and teachers help them build their self-esteem for

their daily social interactions. In the online T&L process, secondary school geography teachers in Malaysia possessed a high degree of assessment expertise.

Level of Knowledge, Skills and Professional Responsibility Practice Variables in Geography Teachers' Teaching Experience

The following analysis was carried out to examine the differences in knowledge, skills and professional responsibility practice in geography teachers' teaching experience in secondary schools. ANOVA was used for inferential statistical analysis. The F-statistic was used as the test statistic in the ANOVA analysis, and the results indicated that the differences between the means were significant. When the obtained p-value was less than the significance level of .05, it suggested that at least two means were significantly different. There was a significant difference between the knowledge variable and teaching experience, $F(1, N) = 23.24, p < .05$. Similarly, an important difference was found between the skills variable and teaching experience, $F(1, N) = 22.01, p < .05$. Additionally, the practice variable showed a significant difference from teaching experience,

Table 5

Analysis of Differences in Levels of Knowledge, Skills, and Practice of Professional Responsibilities based on the Experience of Teaching Geography Teachers

Construct	Causes of Variation	Sum of Square	Degree of freedom	Mean of Square	F	P
Knowledge of authentic assessment	Between Groups	29.200	4	7.300	23.236	.000
	Within Groups	1117.498	375	.314		
	Total	146.698	379			
Skill in authentic assessment	Between Groups	18.511	4	4.628	22.005	.000
	Within Groups	78.653	375	.210		
	Total	97.164	379			
Professional responsibility practice	Between Groups	.736	4	.184	1.758	.137
	Within Groups	39.134	375	.105		
	Total	39.870	379			

$F(1, N) = 1.76, p < .05$. However, it had a lower F-value compared to the knowledge and skills variables.

Analysis of Differences in Levels of Knowledge, Skills and Practice of Professional Responsibilities based on the Experience of Teaching Geography Teacher

The ANOVA test analysis (refer to Table 5) compared the differences in knowledge, skills and practices between geography teachers with and without teaching experience. Each category of teaching experience—5 years and under, 6–10 years, 11–15 years, 16–20 years, and 21 years and over—showed significant differences. The study's findings indicated a significant difference between knowledge and teaching experience, knowledge being the more significant variable ($F=23.236, p<.05$). The result differed from the teachers' perspectives based on the mean value, which showed that professional responsibility practice (mean=4.177) plays a pivotal role in implementing authentic assessment during online T&L. The findings indicated the extent to which each variable related to geography

teachers' professional responsibilities—knowledge, skill, and practice—was present. Geography teachers in Malaysian secondary schools were found to have a high level of knowledge. The findings of this study corroborate Juliana's (2016) study, which stated that teachers' knowledge played a critical role in the development of items for learning assessment instruments. Assessment of students' achievement and abilities is essential to teachers' work through learning assessment.

Furthermore, the analysis revealed that geography teachers in Malaysia possessed advanced skills in implementing authentic assessments conducted in secondary schools. According to Ahmad Fkrudin et al. (2019) and Hanifah et al. (2021), teachers should possess competencies in all areas, including learning skills, critical thinking, planning, facilitation, communication and management, to guarantee both the quality, of accurate evaluation and the efficacy of T&L. The assessment procedure has shifted online due to the extensive use of online learning.

However, this result was in line with the authors' hypothesis, as knowledge was essential to ensure the achievement of the T&L objectives. As with Juliana's (2016) study, this study demonstrates a significant difference in knowledge on conducting assessments between groups of respondents with varying teaching experience. Furthermore, the abilities variable based on teaching experience showed a significant difference. Noorleha and Lilia (2017) stated that teaching experience is the knowledge gained by interacting with factors in the work environment. There was a difference regarding skill according to geography teachers' teaching experience. According to McConnell et al. (2021), teachers who had taught for more than seven years were highly confident in their ability to engage students, design lessons, and assess learning. According to data on the frequency of their teaching sessions, the average teacher has at least 21 years of teaching experience. Rybak (2021) discovered that more experienced teachers were predominantly senior. Chew (2023) stated that multiple types of knowledge were essential to being a distinguished expert in a field and establishing the cognitive processes involved in human learning that teach students to become more effective learners. Lain et al. (2024) also stated that the teachers' experience and knowledge played a pivotal role in shaping a teacher and exposing them to effective training teaching content knowledge. Teachers will need skills and expertise to choose assessment methods because of the adoption of online learning. This study found that teachers' abilities, especially in teaching and evaluation, were impacted by their teaching experience.

Implications of the Study

Most teachers frequently employ conventional

skill assessment methods like mind maps, drawings, and modules. The authentic assessment gives a realistic aspect that resembles real-life situations and tasks that affect high-quality cognitive engagement among students. This assessment helps to stimulate an interest in the subject to enhance learners' perceptions of being judged and help them to feel motivated to study (Kusurkar et al., 2023). This is because, based on student assessment, it highlights an understanding of consequential validity and diversifies the students' cognitive and psychomotor skills. A competent teacher with subject-matter expertise, especially in geography, and pedagogical abilities will be more confident when delivering lessons, thereby improving students' performance (Naquiah & Jimaain, 2017). Students are encouraged to work together to solve complex real-world problems by implementing authentic assessments. Students learn to work together during the hands-on assessment, which is a part of authentic assessment. This collaborative approach reduces the incentive to cheat as they complete the task by brainstorming their ideas. Students can, therefore, improve their social and communication skills as they obtain continuous feedback from teachers and peers to assess the calibre of their work (Gadera, 2023). To conclude, implementing authentic assessment helps develop critical thinking skills, problem-solving, communication, and collaboration among students, which are essential skills in the lead-up to 2025 (World Economic Forum, 2020).

Conclusion and Recommendations

With an emphasis on how well geography

instructors can administer thorough and pertinent assessments under T&L circumstances, this study determined the authentic assessment practice among these educators. In the context of online learning in Malaysia, the results of this study are significant since they close essential gaps in the literature about the state of authentic assessment procedures in geography education today. This study examines geography teachers' knowledge, abilities and professional responsibility practices, offering important insights into the prospects and challenges of improving assessment procedures.

The first significant finding of the study is that geography teachers possess high levels of knowledge, skills and professional responsibility practices, which are essential for implementing authentic assessments. Despite this, the study revealed significant variation in the frequency of such employment, with some teachers still relying on conventional methods. This finding has important theoretical implications, particularly concerning the constructivism theory underpinning the Malaysian National Philosophy of Education (NPE). The study focuses on continuous professional improvement to align teachers' practices with constructivist principles, ensuring that assessments reflect the holistic educational goals outlined in the NPE.

The second significant finding focuses on the impact of teaching experience on implementing authentic assessments. The study showed that more experienced teachers are exposed to a broader range of assessment methods, while younger teachers are more adept at utilising online platforms for authentic assessments. This finding underscores the dynamic nature of teaching and learning, where experience and technological proficiency play critical roles. Theoretically, this means that

although constructivism theory stresses the role of the teacher as a facilitator, this function needs to be modified to fit the changing digital environment, where younger instructors may be better able to use technology for assessment.

Overall, this study concludes that while geography teachers in Malaysia have a strong foundation in knowledge, skills, and professional practices, there is a clear need for continuous development in online assessment methods. The implications for theory, particularly constructivism, suggest that teachers must continue to evolve their practices to incorporate new technologies and methodologies. From a practical and policy perspective, the study highlights the need for targeted professional development programmes to ensure that all teachers, regardless of experience, can effectively engage students in meaningful learning experiences. Teachers are also exposed to advanced technologies as they prepare a suitable authentic assessment for their student's skills. Furthermore, they can get a more accurate picture of the effectiveness of their T&L based on their students' performance and progress. Consequently, teachers can evaluate and refine their lesson plans, assessment methods, learning objectives, indicators, test blueprints and scoring rubrics. Thus, teachers' professionalism in Malaysia can be improved, especially among geography teachers.

This study may also prove useful to curriculum planners and test experts, especially ASEAN teachers. Curriculum planners can design student-centred cross-curricular projects encouraging students to connect with disciplines. According to test experts, authentic assessment guarantees that literacy training promotes metacognition within students as they comprehend and interpret different texts

and social skills. This will be a big step in Malaysia and ASEAN countries to align with Western countries in their education systems and teachers' professionalism.

This study's dependability on self-reported data, which could be biased or inaccurate, is one of its primary weaknesses. Furthermore, the study's exclusive focus on geography as a topic and Malaysia as a geographic region may restrict how broadly the results may be applied in other settings. Future studies should consider incorporating more comprehensive data sources, like student outcomes and classroom observation. A more thorough grasp of authentic assessment processes in various educational environments might be obtained by broadening the study to cover more subjects and geographical areas. This study's scope is restricted to real-world evaluation procedures used in online education. The sole focus of this study is to find teachers' approaches, competencies and experiences with authentic assessment procedures in the online learning process.

Recommendations

More studies on incorporating new technology to improve learning outcomes and student engagement based on authentic assessment procedures should be carried out. Additionally, longitudinal studies could provide valuable insights into how teachers' assessment practices evolve, particularly as they gain more experience with digital tools. Investigating the effectiveness of professional development programmes focused on authentic assessment and technology integration would also be a valuable avenue for future research to inform educational policy and practice. The present study is limited in its population, sampling, context and variables.

This study helped experienced teachers gain insights into how students approach complex problems by discovering new mediums for online T&L assessment. Thus, further studies on the same topic should be given attention, especially in psychology. This is due to changes in the education system that focus on new cognitive skills but also the side effects of screen time on students' brain development. Future research should use a qualitative approach (interview) to achieve more detailed information about teachers' feelings and opinions. Based on this study, geography teachers should continuously enhance their ICT proficiency to meet the demands and development of Generation Z, the group that uses ICT the most.



Statements and Declarations

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