International Journal of Learning, Teaching and Educational Research
Vol. 23, No. 10, pp. 522-543, October 2024
https://doi.org/10.26803/ijlter.23.10.25
Received Aug 19, 2024; Revised Oct 18, 2024; Accepted Oct 24, 2024

Comics as Engaging Tools for Teaching Geography

Hanifah Mahat*, Edlyn Angie Silamat, Yazid Saleh and Nasir Nayan
Universiti Pendidikan Sultan Idris
Tanjong Malim, Perak, Malaysia

Abstract. An educational comic is a graphic work that creates various characters focused on scientific elements as an approach to classroom learning. This study aimed to develop comics as a geography learning module for form four students on river formation and sustainability. This study employs two approaches: questionnaires for the quantitative method and document analysis for the qualitative method. The study analyzed two key documents: geography textbooks and the Curriculum Standard Documents and Assessment (DSKP). Distributing the questionnaire allowed the expert to validate and provide feedback on the applicability of comics. The analysis uses the content validity index (CVI) to evaluate content validity, while descriptive analysis (mean, standard deviation) was used to test the applicability of comics. The study showed that the five experts' CVI analysis of module content, teaching design, and technical requirements is high. Findings showed that the comics' level of applicability is high and can be used as teaching aids during the teaching and learning process in geography lessons. The implications of the study of comics produced enable geography teachers to diversify the construction of comics in other topics, according to DSKP Geography.

Keywords: educational comic; geography; learning module; teaching aids

1. Introduction

Implementing changes within the education system in Malaysia aligns with the National Education Philosophy (NEP). It affects the Primary School Standard Curriculum (KSSR) and the Secondary School Standard Curriculum (KSSM). These changes encompass educational structure, pedagogy, curriculum quality, time allocation, and administration (Mahat et al., 2023). In addition, the implemented changes ensure the commencement of a dynamic education within the school community along with the current changes in the field of education. This change can be seen from elements in pedagogy to create a classroom

* Corresponding author: *Hanifah Mahat, hanifah.mahat@fsk.upsi.edu.my*

atmosphere that allows students to think—applying elements such as constructivism, contextual learning, project-based learning, inquiry-based learning, and future studies during the teaching and learning process (Munna & Kalam, 2021). At the same time, changes in the teaching method can also be seen in the transition from the chalk-and-talk method to 21st-century learning activities such as acting, quizzes, projects, debates, and problem-solving.

Therefore, modules are popular among teachers because they help students learn efficiently (Bafirman, 2023). Moreover, modules provide a learning structure, learning outcomes, syllabus, and assessment schedule to enhance teachers' instructional strategies. A study by Wijayanto et al. (2023), who use modules in teaching Geography, showed that student activities can be diversified and students' interest increased in the classroom regarding geographic information systems (GIS) in Indonesia. In the United Kingdom, geography modules are the main focus of sustainable development among teachers as a pedagogical tool to form a new curriculum model in the diversity of capabilities and disciplines (Nicholson et al., 2023).

The teaching and learning modules are a complete source of teaching aids to help teachers as a guide and facilitators in delivering the topics taught in the classroom. Thus, the content and educational needs solve the teachers' problem of finding resources for teaching aids. The module is an active learning tool for students to improve their thinking and problem-solving skills (Aprianti et al., 2023; Stewart et al., 1999). Various types of modules are utilized as teaching aids for teachers, such as teaching modules, game-based modules, self-learning modules, motivational modules, training modules, academic modules, and guidance modules (Man et al., 2023).

As part of the learning modules, comics help students to understand the concept and increase their motivation.. Comics are pictorial stories compiled from still images to form a story that is easy to understand. A comic is a work of art because it requires drawings and sentences to work as storytelling to the readers (Baharon, 2021). Utilizing comics as a communication channel effectively conveys stories and information, including scientific matters (Tanucan et al., 2023). In a study by Badeo et al. (2021), comic-based learning modules showed that comics helped teachers increase the students' conceptual understanding of Physics as well as the students' motivation significantly

Comics in the teaching and learning process can help teachers improve student understanding through text, visual, spatial, temporal, and sensory aspects of a studied topic (Rahajeng & Muslimah, 2020; Tan & Ruhizan, 2022). Moreover, educational comics help to increase student motivation and attract students' interest during the teaching and learning process in the classroom (MacQueen, 2022). Furthermore, the use of comics in teaching and learning can help in the development of memory, analysis, reasoning, and creativity in learning a topic.

Educational comics also help increase student participation during the teaching process and increases student curiosity, making the learning process more

enjoyable and fun (Fitria et al., 2023; Şentürk & Şimşek, 2021). In addition, educational comics contain good values that apply to students, such as patriotism, responsibility, mutual help, and tolerance. Indirectly, learning by means of comics can form students according to the national educational philosophy that students' education is not only about acquiring knowledge but also about building their self-concept.

However, learning by means of comics in geography was not popular in Malaysia. This is because geography was not a core subject students needed to pass the Malaysia Education Certificate (Sijil Pelajaran Malaysia-SPM) examination compared to Malay Language and History (Kementerian Pendidikan Malaysia, 2022). Thus, geography teaching aids that are sold in bookstores or stationery outlets consist mainly of world maps and revision books, compared to science subjects for which various teaching aids such as comics, magazines, and interactive games are available. This situation shows that teaching aids for Geography are still outdated compared to those for other subjects. Teaching aids play a significant role, especially in improving student motivation and student performance during the teaching and learning process in the classroom. Therefore, this study aims to develop an educational comic that focuses on the theme of physical geography, namely river formation and sustainability, for Form Four students. This topic was chosen because it comprises details of concepts, different types of processes, and various landform formations due to river formation. Therefore, a detailed explanation with exciting text and various graphics will help students understand the topics and attract students' attention in the class. This research paper covers the following two research objectives:

(i) developing Kelas Zuhal educational comics based on the content characteristics for the topic of Formation and Sustainability of Rivers; and
(ii) testing the applicability of Kelas Zuhal educational omics for the topic of Formation and Sustainability of Rivers.

2. Literature Review

In 2017, Malaysia introduced a new secondary school curriculum, the Standard Secondary School Curriculum (KSSM), which includes geography as a subject. This new curriculum focuses on geography skills, physical geography, human geography, area geography, and environmental issues and management (Kementerian Pendidikan Malaysia, 2017). The drafting of the Curriculum and Assessment Standard Document (DSKP) by the Curriculum Development Division (CDD) meets the current requirements for delivering geographic knowledge in a planned curriculum (Mahat et al., 2023). Geography KSSM in lower forms (Form 1 to Form 3) focuses more on the mastery of basic knowledge about the shape and characteristics of space and the environment (Kementerian Pendidikan Malaysia, 2017). Hence, teachers must match their teaching method with learning objectives and student learning styles for effective learning sessions (Alias et al., 2020).

Teaching aids are strongly encouraged to attract students' interest and make teaching sessions non-stereotypical. Creative teaching aids will help the student understand the concept and attract the student's interest and curiosity (Rahman

& Mahamod, 2017). In this case, a teacher is the key driver of the quality of education and needs to have skills and creativity to establish a creative learning atmosphere among students (Amrulloh & Galushasti, 2022). Therefore, a creative teacher will produce a helpful teaching aid that helps students to understand the teaching and learning process. According to Marisda et al. (2024), teaching aids consist of four elements: the source of student learning, the availability of materials, fulfilling the needs of student learning materials, and attracting students' interest to improve their cognitive skills. Teaching aids improve students' cognitive skills in calculations, logical explanations, and the understanding of a topic studied (Alvarez et al., 2023). With the help of teaching aids, there will be less pressure on teachers to make sure the students understand the content taught throughout the day.

In addition, there needs to be a focus on teachers' communication skills when dealing with students (Guo & Asmawi, 2023). Good communication skills help teachers to translate the meaning and message received based on the context of the lesson, the emotions of the message delivered, body language, and the ability to understand implicit messages (Faisal & Adnan, 2021; Peng & González, 2022). It would be of no use if the teacher has expensive teaching aids but lacks communication skills when working with students to identify their weaknesses during the teaching and learning process. Learning consists of instructors, methods, and learning strategies for students (Amrulloh & Galushasti, 2022).

Moreover, learning relates to a change in individual behaviour with regard to existing knowledge, skills, attitudes, and tendencies (Bunari et al., 2024). Learning also means changes in knowledge and behaviour observed through internal mental activity involving good communication skills, critical thinking, collaboration, and problem-solving throughout the learning process (Aristin et al., 2023; Rahman & Mahamod, 2017). Therefore, the teaching aids need to have both written and implied messages with a positive effect. Most studies have proven that teaching aids can attract students' attention to the teaching and learning process, thereby improving students' recall of the lessons presented (Chua et al., 2022).

Several studies show that reading comics actually improves the development of internal skills such as interpretation, analysis, criticism, and application when students identify and explain an issue after understanding the topic after the lesson (Cabrera et al., 2021). In addition, using educational comics helps to improve student performance by 90 per cent and increases the quality of learning (Arief et al., 2022; Fitria et al., 2023). Employing educational comics in teaching and learning sessions is an innovative way of learning that encourages students to achieve optimal learning objectives owing to the combination of graphics, text, and comedy elements that help to attract students' attention and motivate them (Aulia & Wuryandani, 2019). Comics can help to capture students' attention, encourage learning among students, expand creative skills, and increase the passion for learning (Cabrera et al., 2021). These studies show that the contribution of educational comics is effictive in improving student performance and should be studied in more depth for future studies.

Educational comics are suitable for students' study material in geography. A study by Tuko and Hadi (2022) stated that digital educational comics as learning media for geography effectively improve student learning outcomes as these comics are suitable for promoting students' cognitive, emotional, and psychomotor elements. The geography educational comics also help students to be more interested in studying as the information is depicted in colour instead of a few pages of black and white text. Based on the study on geo-comics, learners can relate to the topic based on what they read as well as on what they see. Switching these perspectives for comparison helps deepen their understanding based on their reading of the comic (Reumont & Budke, 2020). Furthermore, geography educational comics also help to enhance learning as the flexibility of the comic both entertains and informs.

As a starting point for developing a teaching aid, a model for developing instructional materials is needed as a central reference for researchers. This study had two suitable models: the Borg and Gall model and the ADDIE (Analysis, Design, Development, Implementation and Evaluation) model. Borg and Gall's model emphasized rigorous field testing and multiple revisions, which required ten stages throughout the development process (Aka, 2019). The stages are information gathering, planning, preliminary product development, expert evaluation, small-scale field testing, major revisions, and final field testing.

In contrast, the ADDIE model was a model that designed an effective step-by-step structured process for developing a teaching aid. This model required five phases: Analysis, Design, Development, Implementation, and Evaluation, which Reiser and Mollenda developed in the 1990s (Untoroseto & Triayudi, 2023). In this study, the ADDIE model was chosen as the reference to develop this comic as this model has an analytical approach that emphasizes that each component interacts with one another in sequential phases (Rayanto & Sugianti, 2020). The evaluation results of each phase are interactive; hence, the subsequent phase allows for for improvement based on the results of the previous phase. Thus, the ADDIE model was chosen as a reference model as it is significantly suitable for this study.

3. Methodology

This study used mixed-method approaches, namely qualitative and quantitative methods. These methods were selected owing to the combination of the methods that helped validate findings to achieve strong evidence for a study. Thus, this approach was chosen to offset method limitations and prove the applicability of educational comics to students and teachers. Qualitative methods were used in developing educational comics based on document analysis, while quantitative methods were used by distributing questionnaires to Geography teachers to test the applicability of educational comics. The ADDIE model was a central reference by researchers for developing this comic, which required five phases. The first phase was an analysis phase in which the geography textbook and Curriculum Standard Documents and Assessment (DSKP) were analyzed in this study. This analysis phase was a part of the qualitative method. All information in the comic must follow the guidelines in DSKP and the textbook because both relate to the

syllabus that outlines the themes, soft skills, pedagogical approaches, and assessment standards.

The second phase was the design phase. After the first phase had been conducted, the researchers focused on five aspects during the development of the comics. These aspects became the main elements of the comic as an educational comic and a type of teaching aids. Next was the development phase. This phase required researchers to design all aspects related to the second phase into an educational comic. The third phase was the implementation phase. This phase was focused on teachers who teach the Form Four Geography subjects in all secondary schools under the Malaysian Ministry of Education as a sample to test the applicability of educational comics. In this study, the purposeful sampling method was the quantitative method, consisting of five Form Four geography teachers from five different schools in Malaysia (two schools from Perak and three schools from Sarawak) who agreed to become the study participants. The participants used the educational comic based on river formation and sustainability as their teaching aids. The last phase was the evaluation phase. In this phase, the study data consisted of the questionnaires given to the five teachers to answer the two study questions about the applicability of the educational comic (Appendix 1). Furthermore, this educational comic's applicability to students is based on the teachers' achievement of learning objectives (Appendix 1).

The format of the measuring instrument used was the Likert scale, where each statement had three alternative answers: Strongly agree with a score of 3, Disagree with a score of 2, and Strongly disagree with a score of 1. The data was grouped into three levels, and analyzed by calculating each statement's mean and standard deviation. An instrument's validity must have a high mean value of four to five. The high mean indicates that most of the sample agreed on the variable which proves the effectiveness of the study regarding the participants' learning.

4. Findings and Discussion

The respondents of this study were five geography teachers who teach Form Four students in Perak and Sarawak. Through the quantitative method of testing, all teachers agreed on the applicability of comics, namely that educational comics should be suitable for users and conform to the content of the Curriculum and Assessment Standard Document (DSKP) and the Form Four geography textbook. Therefore, the aspects of focus during the development of educational comics and part of the design phase in the ADDIE model were the following:

(i) they should be applicable to students and teachers;
(ii) they should have a focal concept;
(iii) there should be clear comic objectives;
(iv) they should contain relevant content; and
(v) there should be a diversity of comic elements.

For the first aspect, the comic is open to students and teachers. The educational comic's development involved two user groups: teachers and four students who either took or taught geography as an elective. Students from other cultures can also read this educational comic because the context and content are the basis for

the topic of river formation. This comic would help students improve their general knowledge, especially in geography. The second aspect is having important concepts for students to learn and know. The topic of the Formation and Sustainability of Rivers focused on the concept of river formation, the concept of erosion, the concept of transport, and the concept of sedimentation. Hence, students will learn these topics to help them master the syllabus.

The third aspect to focus on is having an objective. The educational comic sets specific objectives for teachers. There are three objectives: learning comics help teachers attract students' interest, help increase students' understanding, and facilitate teachers in providing teaching aids for Formation and River Sustainability. The fourth aspect is having relevant content. The focused content is based on DSKP and Form Four's geography textbooks. This content must follow the DSKP guidelines that outline the themes based on the students' cognitive level.

The last aspect focused on is the diversity of elements. The diversity of elements is divided into five characteristics: use of colours and graphics, diversity of characters, being scientific, being humorous, and being user-friendly. The first feature relates to appropriate colours and graphics. It is essential to attract interest in reading and improve students' senses during the teaching and learning process. Next, elements must help emphasize the variety of characters to help highlight the message to the students and make the content suitable for the teaching and learning process. Therefore, Figure 1 is an example of the Kelas Zuhal educational comic.

This educational comic relies on humour and conveys the message by influencing the reader's emotions. The last feature in terms of element diversity is user-friendliness. Developing user-friendly educational comics helps teachers and students participate in exciting teaching and learning processes.

Figure 1: Kelas Zuhal educational comic

The applicability of comics was analyzed with five geography teachers, as shown in Table 1. The results showed that the mean value for the construct of comic effectiveness was 5.00, and the standard deviation was 2.19. The comic efficiency construct's mean value is 4.89, and the standard deviation is 2.21. Finally, a mean of 4.90 and a standard deviation of 2.21 were recorded for the comic satisfaction construct. The mean value of the entire construct was 4.93, while the standard deviation was 2.57.

Table 1: Construct analysis

Construct	N	Mean	SD
Comic effectiveness	5	5.00	2.19
Comic efficiency	9	4.89	2.21
Comic satisfaction	10	4.90	2.21
Total	24	4.93	2.57

Next, the analysis was carried out to examine each item in the construct of the effectiveness of the Kelas Zuhal educational comics in Table 2. For the sub-construct content, the respondents strongly agreed with items B1 and B3; the mean value was 5.00 (high level). Respondents strongly agreed with item B5, which recorded a mean value of 5.00 (high level) for the comic format sub-construct, which is the comic format. Therefore, the overall mean for this item was 4.80, and the standard deviation was 2.19.

Table 2: Comic effectiveness analysis

Comic effectiveness construct	Low level		Mid-level		High level		Mean	SD	Average level
	N	%	N	%	N	%			
Contents of comic									
B1 - I could teach the topic of River Formation and Sustainability based on comics.	0	0	0	0	5	100	5.00	2.24	High level
B2 - I understand the objective of the comic clearly.	0	0	0	0	5	100	5.00	2.24	High level
B3 - I find the application idea in the teaching and learning process enjoyable.	0	0	1	20	4	80	4.67	2.16	High level
Comic format									
B4 - I can understand the type and size of the font used in the comic.	0	0	2	40	3	60	4.33	2.08	High level
B5 - I can understand the attached sample assessment.	0	0	0	0	5	100	5.00	2.24	High level

In the analysis of the construct of comic efficiency in Table 3, which was the sub-construct of the accessibility of learning objectives, respondents strongly agreed with items C1, C2, and C3 with a mean value of 5.00, which is a high level. For the sub-construct of the effectiveness of teaching aids, respondents strongly agreed with items C6, C7, and C8, contributing to a mean of 5.00, which was high. Therefore, the overall mean for this item was 4.80, and the standard deviation was 2.19.

Table 3: Comic efficiency analysis

Comic efficiency construct	Low level		Mid-level		High level		Mean	SD	Average level
	N	%	N	%	N	%			
Accessibility of learning objectives									
C1 - Comics help students achieve learning objectives.	0	0	0	0	5	100	5.00	2.24	High level
C2 - Comics can improve students' understanding.	0	0	0	0	5	100	5.00	2.24	High level
C3 - Comics suit the cognitive level of Form 4 students.	0	0	0	0	5	100	5.00	2.24	High level
C4 - Students can perform the assessment well.	0	0	1	20	4	80	4.67	2.16	High level

C5 - Comics can open the space for students to think more broadly.	0	0	1	20	4	80	4.67	2.16	High level
Effectiveness of teaching aids									
C6 - Suggested comics are relevant.	0	0	0	0	5	100	5.00	2.24	High level
C7 - Comics help achieve learning objectives	0	0	0	0	5	100	5.00	2.24	High level
C8 - Comics help strengthen student understanding.	0	0	0	0	5	100	5.00	2.24	High level
C9 - Comics help stimulate students' creativity	0	0	1	20	4	80	4.67	2.16	High level

The analysis of each item in Table 4, Kelas Zuhal's educational comic satisfaction construct, was applied in this study. For the sub-construct of student interest criteria, respondents strongly agreed with items D1, D2, and D3, which had a mean value 5.00. For the teachers' interest criteria sub-construct, items D7, D8, D9, and D10 showed that respondents strongly agreed with the item; the mean value was 5.00. Therefore, the overall mean for this item was 4.80, and the standard deviation was 2.19.

Table 4: Satisfaction comic analysis

Comic satisfaction construct	Low level		Mid-level		High level		Mean	SD	Average level
	N	%	N	%	N	%			
Student interest criteria									
D1 - I managed to interest students in the teaching and learning process with the help of modules.	0	0	0	0	5	100	5.00	2.24	High level
D2 - My students enjoy doing learning activities.	0	0	0	0	5	100	5.00	2.24	High level
D3 - My students cooperate well in learning activities.	0	0	0	0	5	100	5.00	2.24	High level
D4 - My students focus more in the classroom.	0	0	1	20	4	80	4.67	2.16	High level
D5 - I can see the diversity of student creativity in each task.	0	0	1	20	4	80	4.67	2.16	High level
Teacher interest criteria									
D6 - I can use comics easily.	0	0	1	20	4	80	4.67	2.16	High level
D7 - I can use comics easily.	0	0	0	0	5	100	5.00	2.24	High level

D8 - I can correct errors in the assessment carried out.	0	0	0	0	5	100	5.00	2.24	High level
D9 - I am more confident in carrying out the assessment after this.	0	0	0	0	5	100	5.00	2.24	High level
D10 - I am satisfied with the whole comic.	0	0	0	0	5	100	5.00	2.23	High level

In this study, the development stage of the educational comic took two months to produce so that all the characteristics of the comic content were applied. This stage was a part of the development phase in the ADDIE model. The evaluation stage by experts (teachers and lecturers) who specialized in education and geography followed. This phase took two weeks and was important to ensure that this comic was suitable for teaching and learning aids in school. The first stage ensured that the content features fit according to the guidelines in the DSKP and textbooks. Among the characteristics of comic content discussed in the development of this eductional comic are that it is applicable to teachers and students, and has a concept, comic objectives, relevant content, and a diversity of comic elements. The requirements study involved an official document analysis in the first stage of developing the Kelas Zuhal educational comic draft. The document analysis involved the geography Form Four DSKPs. This analysis is necessary to obtain information for the content to meet the cognitive ability of Form Four students. This finding was in line with the findings of a study by Ramli (2006), involving the characteristics of content in comicswhich stated that the use of appropriate teaching tools can facilitate the explanation of a topic because it is more realistic compared to the application of conventional methods (Radzi, 2020). The content features should be compatible with the students' cognitive ability, which can help students with the formative assessment system in Malaysia to determine the students' actual ability in relation to other students (Kementerian Pendidikan Malaysia, 2017; Yusof & Othman, 2019). In this study, the development stage of the educational comic took two months to produce to ensure that all the characteristics of the comic content were applied. Subsequently, the evaluation stage took two weeks to be evaluated by expert teachers in geography, geography lecturers, and lecturers specializing in education.

For the implementation and evaluation phase, the comic was tested in five different schools by five teachers over two to three weeks. Overall, the findings showed that the mean score for the three constructs of the applicability of learning comics, namely effectiveness, efficiency, and satisfaction of comics, is high. Each obtained a mean score of 5.00, 4.89, and 4.90, respectively. Based on the interpretation of mean scores from Landell (1997), the scores of these three constructs are at a high level. This finding showed that the Kelas Zuhal educational comic is effective and practical for teaching and learning. This finding is in line with the study by Radzi (2020), which shows positive changes through understanding, interest, and creativity. The study needs feedback on the effectiveness of the Kelas Zuhal educational comic. The findings showed that the

construct of effectiveness that obtained a high value was comic satisfaction, with a mean score of 5.00 and a standard deviation of 2.19.

This result shows that the geography teachers who expressed their opinions agreed with the content of the comic. Appropriate comic content increases the tendency to master the subject or topic and improves student character by applying student values and learning quality (Krishnan et al., 2022). Furthermore, educational comics can be a visual communication tool because students grasp basic ideas from educational comics. Also, applying concepts in educational comics helps improve learning outcomes and student understanding, which helps improve student performance on the topic (Fitria et al., 2023; Wahyuningsih, 2012). Comics compatible with students' cognitive abilities are also influenced by applying constructivist theory, which focuses on the four dimensions of learning styles. Interrelationships between models that are appropriate to the characteristics of the content can show the level of effectiveness of the comic based on the student's cognition.

The findings for the competence construct showed that the educational comics had a mean score of 4.89, which is at a high level, and a standard deviation of 2.21. These findings showed that the teachers strongly agree that this educational comic makes teaching and learning easier. This finding is similar to the study conducted by Bramlett et al. (2016), which states that the teacher only acts as a facilitator to help the students during the teaching and learning process. This is because students can learn about the topic independently through self-reading from comics. The habit of reading comics has been established since childhood; it is possible to prove that students' level of interest in reading and educational comics is high and that educational comics as a teaching aid are suitable for students.

The holistic development of students through the application of assessment can strengthen the national education system through modifications based on the school curriculum. According to Tarispin et al. (2021), matching student learning styles with teaching aids contributes to the development of education based on the National Philosophy of Education (NPE). The change in the assessment system and the use of teaching aids shows great strides in the development of the education system in Malaysia compared to 50 years ago. It can be seen that the National Education Development Plan (PPPN) is capable of producing quality and skilled students, which is a result of the transformation of education (Ghoni, 2018; Kementerian Pendidikan Malaysia, 2017). The findings of this study showed that this educational comic only covers three VARK (visual, auditory, reading, and kinesthetic) learning models: visual, reading, and kinesthetic. This is because the comic displays illustrated stories to help attract the students' focus and involvement during the teaching and learning. Since the comic is not interactive, it does not have sound to implement the auditory element based on the VARK learning model.

The satisfaction of using the Kelas Zuhal educational comics is in terms of user satisfaction based on student interest and teacher comfort. These two criteria received high mean scores of 4.44 and 4.60, respectively. The finding showed that

using this comic allows students to focus in class during the teaching and learning process, resulting in high levels of interest. This result is due to the comics' entertainment and humour, which can satisfy students' preferences during teaching and learning. Furthermore, this innovative way of learning encourages students to achieve maximum learning objectives. It reduces the teachers' tasks during the teaching and learning process, which is compatible with 21st-century learning activities (Santana & Arroio, 2011). The appropriateness of learning activities influences students' cognitive, psychomotor, and affective domains that promote effective learning. The comic helps the students develop their cognitive development and positively impacts student achievement (Rahman & Mahamod, 2017). Appropriate materials, such as teaching aids, can help students focus during teaching and learning (Faeez Ilias et al., 2016).

Based on this study, the limitation of this learning comic was that it did not accommodate all students' learning styles. Based on the VARK (visual, auditory, learning, and kinesthetic) learning model, this comic does not satisfy the auditory element because the comic is not an interactive comic that comes with sound. This comic was developed based on preferred adolescent school students' kinesthetic and visual learning styles (Irmaningrum et al., 2020). The preferred learning styles among students help teachers formulate appropriate teaching strategies and improve students' abilities to learn and perform better. Compared to other geography comics, Kelas Zuhal educational comics apply to students and teachers. These users can use this comic as their reference other than the textbook to understand the concepts and process of landform formation in this topic. This will help the students to understand and improve themselves during knowledge sharing as they think critically based on their reading of the comic.

5. Conclusion

Based on the study's first objective, the development of Kelas Zuhal's educational comic took two months to apply the learning comic characteristics applicable to teachers and students. It contains concepts, comic objectives, relevant content and diversity of the comic element. These characteristics are essential to ensure that the comic suits students' preferences and cognitive levels. The second objective was achieved in this study as mean data in each table showed a high level of mean based on the users. This showed that this comic can be applied as a teaching and learning aid for teachers and students during the teaching and learning process. As a result, students achieved the learning objectives set by the teacher in addition to improving their thinking skills throughout the assessment activities, which showed cognitive development. As for teachers, this comic is helpful as a teaching aid as students can carry out the teaching and learning process through hands-on activities modified by teaching in their lesson plans.

However, the limitation of this study, which lacked an auditory element based on the VARK (visual, auditory, reading, and kinesthetic) learning styles, is a significant recommendation for further research in the future. This will help address more implementation issues, especially regarding the issue of Geography teaching aids.

6. Acknowledgement

This research was supported by Universiti Pendidikan Sultan Idris (UPSI) through the University Research Grants (GPUIP 2022-0109-107-01).

7. References

Aka, K. A. (2019). Integration of Borg & Gall (1983) and Lee & Owen (2004) models as an alternative model of design-based research of interactive multimedia in elementary school. *Journal of Physics: Conference Series, 1318,* Article 012022. https://doi.org/10.1088/1742-6596/1318/1/012022

Alias, J., Muslim, N., Ahmad, A., Hassan, W. Z., Mohamad, Z. Umar, A., Yusof, N. A., & Mat, N. (2020). Pengalaman pengajaran dan pembelajaran subjek MPU secara blended dan active learning di Pusat CITRA Universiti Kebangsaan Malaysia [Experience of teaching and learning MPU subjects in blended and active learning at CITRA Center, National University Malaysia]. *Jurnal Personalia Pelajar*, *23*(2), 95–101. https://spaj.ukm.my/personalia/index.php/personalia/article/view/189

Alvarez, J. H., Salazar, J. L, Alvarez, G. M., Gonzalez, J. A. P., & Quispe, A. H. (2023). Mixed gamification with virtual tools modify poor school performance. *International Journal of Evaluation in Research in Education (IJERE), 12*(3), 1663–1673. https://doi.org/10.11591/ijere.v12i3.25530

Amrulloh, M. S., & Galushati, A. (2022). Professional development teacher to improve skills of science process and creativity of learners. *Journal of Education and Learning (EduLearn), 16*(3), 299–307. https://doi.org/10.11591/edulearn.v16i3.20404

Aprianti, R., Ambarwulan, D., & Purwahida, R. (2023). Improving high school students' conceptual knowledge using contextual E-Module on optical devices topic. *Journal of Physics: Conference Series, 2596(*1), Article 012073. https://doi.org/10.1088/1742-6596/2596/1/012073

Arief, Z. A., Mujahidin, E., & Hartono, R. (2022). The effect of digital comic media on East Asian students' English language learning outcomes. *International Journal of Society, Culture and Language, 10*(3), 117–124. https://doi.org/10.22034/ijscl.2022.551349.2604

Aristin, N. F., Hastuti, K. P., Arisanty, D., Adyatma, S., & Donna, C. (2023). Effectiveness of problem-based learning models to improve learning outcomes of geography in the new normal learning era. *Journal of Education and Learning (EduLearn), 17*(4), 623–632. https://doi.org/10.11591/edulearn.v17i4.20834

Aulia, N., & Wuryandani, W. (2019). Multicultural strip comic as a learning media to improve the caring character in primary school. *Journal of Education and Learning, 13*(4), 527–533. https://doi.org/10.11591/edulearn. v13i4.13330

Badeo, J. M. O., & Koc, B. C. U. O. K. (2021). Use of comic-based learning module in physics in enhancing students' achievement and motivation. *Science Education International, 32(*2), 131–136. https://files.eric.ed.gov/fulltext/EJ1306177.pdf

Bafirman, B., Zarya, F., Wahyuri, A. S., Ihsan, N., & Batubara, R. (2023). Improving the martial art skills and physical fitness quality of students Grade VII through e-module development. *Journal of Physical Education and Sport*, *23*(12), 3271–3281. https://doi.org/10.7752/jpes.2023.12374

Baharon, M. (2021, 16 March). Komik medium pembelajaran Baharu? [Comics as a new learning medium?]. *Dewan Masyarakat.* https://dewanmasyarakat.jendeladbp.my/2021/03/16/102/

Bramlett, F., Cook, R. T., Meskin, A., Tilley, C. L., & Weiner, R. G. (2016). *The Routledge companion to comics teaching and learning with comics publication.* Taylor & Francis Group.

Bunari, B., Setiawan, J., Ma'arif, M. A., Purnamasari, R., Hadisaputra, H., & Sudirman, S. (2024). The influence of flipbook learning media, learning interest and learning

motivation on learning outcomes. *Journal of Education and Learning (EduLearn), 18*(2), 313–321. https://doi.org/10.11591/edulearn.v18i2.21059

Cabrera, P., Gonzalez, P., & Ochoa, C. (2021). Using Pixton for teaching EFL writing in higher education during the COVID-19 pandemic. *International Journal of Learning, Teaching and Educational Research, 20*(9), 102–115. https://doi.org/10.26803/ijlter.20.9.7

Chua, C. H., Kosnin, A. M., & Yeo, K. J. (2022). Exploring A-level mathematics teachers' teaching practices and use of technology. *International Journal of Evaluation and Research in Education (IJERE), 11*(3), 1512–1523. https://doi.org/10.11591/ijere.v11i3.22672

Faisal, S. A. M, & Adnan, N. H. (2021). Tahap kesediaan dan penerimaan guru dalam mempraktikkan penggunaan teknologi digital RI 4.0 sebagai bahan bantu mengajar dalam pendidikan rendah [Level of readiness and acceptance of teachers in practicing the use of digital technology RI 4.0 as a teaching aids in primary education]. *International Journal of Advanced Research in Islamic Studies and Education (ARISE), 1*(3), 66–80. https://myjurnal.mohe.gov.my/filebank/published_article/113598/ARISE_2021_1307_Sarah_terbit.pdf

Fitria, Y., Malik, A., Mutiaramses, H. S. H., & Amelia, R. (2023). Digital comic teaching materials: Its role to enhance student's literacy on organism characteristic topic. *Eurasia Journal of Mathematics, Science and Technology Education, 19*(10), em2333. https://doi.org/10.29333/ejmste/13573

Ghoni, A. A. (2018). Pendidikan kita bertaraf dunia [Our education is world class]. *Rencana Majalah Pendidikan,* Feb 2018: Jilid 120.

Guo, J., & Asmawi, A. (2023). Exploring foreign teachers' perceptions of communication with students in online learning in China: A case study. *International Journal of Learning, Teaching and Educational Research*, *22*(1), 228–246. https://doi.org/10.26803/ijlter.22.1.13

Irmaningrum, R. N., Zativalen, O., & MZ, A. F. S. A. (2022). The development of e-comics media based on the VARK model to measure the understanding of elementary school students. *Eduhumaniora: Jurnal Pendidikan Dasar, 16(*1), 85–96. https://doi.org/10.17509/eh.v15i1.51780

Kementerian Pendidikan Malaysia (Ministry of Education Malaysia). (2022). *Maklumat pendafataran peperiksaan SPMU dan SPM* [SPMU and SPM exam registration information]. Kementerian Pendidikan Malaysia. https://sppat2.moe.gov.my/cp/gen/INFO%20PENDAFTARAN%20SPM%20SPMU%202024.pdf

Kementerian Pendidikan Malaysia (Ministry of Education Malaysia). (2017). *Dasar Pendidikan Kebangsaan* [National Education Policy]. Kementerian Pendidikan Malaysia. https://www.pmo.gov.my/dokumenattached/Dasar/09dasar_pendidikan_kebangsaan.pdf

Krishnan, C. D. R., Rahman, R. S. A. R. A., & Othman, N. (2022). Keberkesanan modul komik mata pelajaran perniagaan Tingkatan 4 [The effectiveness of the Form 4 business comic module]. *Akademika, 92*, 163–178. file:///C:/Users/User/Downloads/59096-196307-1-PB.pdf

Landell, K. (1997). *Management by menu.* Wiley & Sons.

MacQueen, B. (2022). *Tooned in to reading: Comic books and graphic novels as reading motivation.* Trident University International.

Mahat, H., Nayan, N, & Hashim, M. (2023). *Kebitaraan pengajaran dan pemudahcaraan geografi di sekolah* [Teaching and facilitation of geography in schools]. Universiti Pendidikan Sultan Idris.

Man, N. N. S. N., Junus, N. W. M., Anwar, N. A. K., Tarmizi, R. A., Setambah, M. A. B., Azmi, S. H., Koning, S. I., & Jaafar, W. N. W. (2023). Analisis keperluan untuk membangunkan modul pembelajaran neotrik matematik bagi murid Tathun 2 dalam bidang nombor dan operasi [Needs analysis for the development of mathematics neoteric learning module for students in Year 2 in number and operation field]. *Journal of Science and Mathematics Letters, 11,* 9–22. https://doi.org/10.37134/jsml.vol11.sp.2.2023

Marisda, D. H., Handayani, Y., Aprilia, M. S., Basri, S., & Suhardiman. (2024). Analyzing textbook requirements to create physics learning resources. *International Journal of Evaluation and Research in Education (IJERE), 13*(2), 1078–1087. https://doi.org/10.11591/IJERE.v13I2.26813

Munna, A. S., & Kalam, M. A. (2021). Teaching and learning process to enhance teaching effectiveness: A literature review. *International Journal of Humanities and Innovation (IJHI), 4*(1), 1–4. https://doi.org/10.33750/ijhi.v4i1.102

Nicholson, D. T., Vargas, V. R., & Skelly, G. (2023). Enquiry-based skills education for sustainable development in a UK geography module as a catalyst for organisational change. *International Journal of Sustainability in Higher Education*, *24*(8), 1898–1915. https://doi.org/10.1108/IJSHE-07-2022-0225

Peng, C., & Rafael-González, G. (2022). A comparative study of primary 1 students' attitude toward and achievement in Chinese language class under game teaching method and traditional teaching method at an international school in Thailand. *Human Sciences, 14*(2), 539–551. http://www.assumptionjournal.au.edu/index.php/Scholar/article/view/5496

Radzi, W. N. (2020). *Penerapan bahan pendidikan komik dalam pembelajaran dan pemudahcaraan prosa tradisional (KOMSAS)* [The application of comic educational materials in the learning and facilitation of traditional prose (KOMSAS)]. Universiti Pendidikan Sultan Idris.

Rahajeng, I. M., & Muslimah, F. (2020). Towards safe blood-transfusion practice for nurses: Effectiveness of comic-based learning tool. *Enfermeria Clinica, 30*(S7), 126−130. https://doi.org/10.1016/j.enfcli.2020.07.026

Rahman, S., & Mahamod, Z. (2017). *Inovasi pengajaran dan pembelajaran mengoptimumkan pembelajaran pelajar [Teaching and learning innovations optimizing student learning].* Dewan Bahasa dan Pustaka.

Ramli, L. S. (2006). *Perkaitan antara bahan bantu belajar dan gaya pembelajaran dengan pencapaian kertas bahasa melayu dalam kalangan murid bukan Melayu* [The relationship between learning aids and learning style with Malay language paper achievement among non-Malay students]. Universiti Pendidikan Sultan Idris.

Rayanto, Y. H., & Sugianti, S. (2020). *Applying objectivist instructional design of ADDIE model on learning reading comprehension* [Conference session]. Proceedings of the International Conference on Community Development (ICCD 2020) (pp. 795−799). Atlantis Press. https://doi.org/10.2991/assehr.k.201017.175

Reumont, F., & Budke, A. (2020). Strategies for successful learning with geographical comics: An eye-tracking study with young learners. *Education Sciences, 10(*10), Article 293. https://doi.org/10.3390/educsci10100293

Santana, E. R., & Arroio, A. (2011). Comics: A tool for teachers and students in teaching and learning science. *Natural Science Education, 8*(2), 49–59. https://doi.org/10.48127/gu-nse/11.8.49a

Şentürk, M., & Şimşek, U. (2021). Educational comics and educational cartoons as teaching material in the social studies course. *African Educational Research Journal, 9*(1), 515−525. https://doi.org/10.30918/AERJ.92.21.073

Stewart, J. L. (1999). *A guide to teaching with modules*. Hope College. https://www.researchgate.net/publication/251165712

Tan, C., & Ruhizan, M. Y. (2022). Penerapan kaedah didik hibur dalam pembelajaran bahasa Inggeris di sekolah luar [The application of fun learning methods in learning English in foreign schools]. *Jurnal Dunia Pendidikan, 4*(1), 459–474. http://myjms.mohe.gov.my/index.php/jdpd

Tanucan, J. C., Alejandro, B. A., & Corcino, R. B. (2023). Towards an enhanced implementation of printer modular distance learning in the Philippines: A meta-synthesis. *International Journal of Learning, Teaching and Educational Research*, *22*(3), 341–358. https://doi.org/10.26803/ijlter.22.3.21

Tasripin, N., Damanhuri, Z., & Zaki, M. A. (2021). Keberkesanan aplikasi pembelajaran interaktif dalam proses pengajaran dan pembelajaran di tadika [The effectiveness of interactive learning applications in the teaching and learning process in kindergarten]. *Jurnal Ilmi, 11,* 129–136. https://www.unimel.edu.my/journal/index.php/JILMI/article/view/1033/842

Tuko, E., & Hadi, B. (2021). *The development of GEOMIK: Digital comic as a media for geography learning in Class XI* [Conference session] Proceedings of the 5th International Conference on Current Issues in Education (ICCIE 2021) (pp. 329−334). Atlantis Press. https://doi.org/10.2991/assehr.k.220129.060

Untoroseto, D., & Triayudi, A. (2023). Analysis of blended learning development in distance learning in variation of Borg & Gall and Addie Models. *Journal la MultiApp, 4*(6), 231–243. https://doi.org/10.37899/journallamultiapp.v4i6.973

Wahyuningsih, A. N. (2012). Pengembangan media komik bergambar materi sistem saraf untuk pembelajaran yang menggunakan strategi PQ4R [The development of comic media with images of nervous system material for learning that uses the PQ4R strategy]. *Journal of Information Systems Education, 1*(1), 102–110. http://journal.unnes.ac.id/sju/index.php/jise

Wijayanto, B., Sumarmi, S., Utomo, D. H., Handoyo, B., & Aliman, M. (2023). Development of e-module based on geospatial technology to improve TPACK competencies of geography pre-service teacher: A needs analysis review. *Journal of the Association of Information Communication Technologies, Education and Science, 12(*2), 1190–1200. https://doi.org/10.18421/TEM122-65

Yusof, M. H., & Othman, N. (2019). *Isu dan permasalahan pentaksiran alternatif dalam sistem penilaian di Malaysia* [Alternative assessment issues and problems in the assessment system in Malaysia]. E-Prosiding Persidangan Antarabangsa Sains Sosial dan Kemanusiaan, Selangor.

Appendix 1

EDUCATIONAL COMICS AS A LEARNING MODULE FOR THE TOPIC OF RIVER FORMATION AND SUSTAINABILITY, GEOGRAPHY, FORM FOUR

1. The purpose of this questionnaire is to collect and analyze teachers' opinions about the applicability of Kelas Zuhal Learning Comics.
2. This questionnaire consists three sections:

Section A: Respondent Background
Section B: Comic Effectiveness
Section C: Comic Competence
Section D: Comic Satisfaction

3. It is hoped that all the answers are honest for accurate research results.
4. All information provided is confidential and for research purposes only.
5. Please complete all sections.
6. Your cooperation is greatly appreciated.

SECTION A: RESPONDENT BACKGROUND
Remark: Place an (/) mark in the box of your answer.

1. Gender:
   - ☐ Male
   - ☐ Female

2. Age:
   - ☐ 26 - 30 years old
   - ☐ 31 -35 years old
   - ☐ 36 - 40 years old
   - ☐ 41 years old and above

3. Type of occupation
   - ☐ Teacher
   - ☐ Lecturer

4. Service period:
   - ☐ 1 to 5 years
   - ☐ 6 to 10 years
   - ☐ 11 to 15 years
   - ☐ 15 years and above

5. Field of occupation (Please state):_____

Remark: Please indicate your level of agreement or disagreement based on the statement below for Kelas Zuhal educational comic feedback. Please circle your answer based on the scale below:

3 - Agree
2 - Partially agree
1 - Disagree

SECTION B: COMIC EFFECTIVINESS				
NO.	**STATEMENT**	**SCALE**		
Contents of comic				
1	I was able to teach the topic of River Formation and Sustainability based on comics.	1	2	3
2	I understand the objective of the comic clearly.	1	2	3
3	I find the idea of application in the teaching and learning process interesting.	1	2	3
Comic format				
4	I can understand the type and size of the font used in the comic.	1	2	3
5	I can understand the attached sample assessment.	1	2	3

SECTION C: COMIC EFFICIENCY				
NO.	**STATEMENT**	**SCALE**		
Accessibility of Learning Objectives				
1	Comics help students achieve learning objectives.	1	2	3
2	Comics that are read can improve students' understanding.	1	2	3
3	Comics suit the cognitive level of Form 4 students.	1	2	3
4	Students can perform the assessment well.	1	2	3
5	Comics can open the space for students to think more broadly.	1	2	3
Effectiveness of Teaching Aids				
6	Suggested comics are relevant.	1	2	3
7	Comics help achieve learning objectives.	1	2	3
8	Comics help strengthen student understanding.	1	2	3
9	Comics help stimulate students' creativity.	1	2	3

SECTION D: SATISFACTION COMIC				
NO.	**STATEMENT**	**SCALE**		
Student Interest				
1.	I managed to interest students in the teaching and learning process with the help of modules.	**1**	**2**	**3**
2.	My students enjoy doing learning activities.	**1**	**2**	**3**
3.	My students give good cooperation in learning activities.	**1**	**2**	**3**
4.	My students focus more in the classroom.	**1**	**2**	**3**
5.	I can see the diversity of student creativity in each task.	**1**	**2**	**3**
Teacher Interest Criteria				
6.	I can use comics easily.	**1**	**2**	**3**
7.	I can use comics easily.	**1**	**2**	**3**
8.	I can correct errors in the assessment carried out.	**1**	**2**	**3**
9.	I am more confident in carrying out the assessment after this.	**1**	**2**	**3**
10.	I am satisfied with the whole comic.	**1**	**2**	**3**