Student Response to the Innovation of Creating Steam-Based E-Books in the Early Childhood Creativity Development Course

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ABSTRAK

Penggunaan media digital dapat mempermudah pelaksanaan pembelajaran, serta membantu peserta didik untuk melek terhadap teknologi. Adapun tujuan dari penelitian ini yakni untuk menganalisis respon mahasiswa terkait pemanfatan book creator guna memenuhi inovasi media pembelajaran digital. Penelitian ini tergolong kedalam jenis penelitian kualitatif dengan metode deskriptif analisis. Subjek yang terlibat dalam penelitian ini yakni 54 orang mahasiswa. Pengumpulan data menggunakan metode observasi, wawancara, dokumentasi dan kuesioner, dengan instrument penelitian berupa pedoman observasi, wawancaram serta lembar angket. Hasil penelitian menunjukkan bahwa 100% mahasiswa mengetahui mengenai book creator. 87% mahasiswa menyatakan bahwa inovasi desain e-book menarik. 66,7% menyatakan pengembangan kreativitas melalui science dapat dimengerti. 70,4% menyatakan pengembangan kreativitas melalui technology dapat dimengerti. 72,2% menyatakan pengembangan kreativitas melalui engineering dapat dimengerti. 68,5% pengembangan kreativitas melalui art dapat dipahami. 79,6% menyatakan pengembangan kreativitas melalui mathematics dapat dimengerti. Disimpulkan bahwa terdapat inovasi baru dari penciptaan e-book melalui book creator, hal tersebut tercermin dari muatan e-book yang didesain dengan menarik dan berbasis STEAM. Respon mahasiswa membuktikan bahwa mahasiswa paham mengenai pembuatan e-book dengan menggunakan book creator dan mahasiswa mampu dalam mengembangkan kreativitas melalui science, technology, engineering, art, dan mathematics dengan lebih menarik sehingga mudah dipahami.

ABSTRACT

Digital media can facilitate the implementation of learning and help students be literate about technology. This study aims to analyze student responses regarding the use of book creators to fulfill digital learning media innovations. This research belongs to the type of qualitative research with descriptive analysis method. The subjects involved in this study were 54 students. Data collection used observation, interviews, documentation, and questionnaires, with research instruments in the form of observation guidelines, interviews, and questionnaires. The results showed that 100% of students knew about book creators. 87% of students stated that e-book design innovations were interesting. 66.7% stated that the development of creativity through science is understandable. 70.4% stated that the development of creativity through technology is understandable. 72.2% stated that the development of creativity through engineering is understandable. 68.5% of the development of creativity through art can be understood. 79.6% stated that the development of creativity through mathematics is understandable. It was concluded that there are innovations in creating e-books through book creators. It is reflected in the content of e-books which are attractively designed and based on STEAM. Student responses prove that students understand making e-books using book creators, and students can develop creativity through science, technology, engineering, art, and mathematics in a more interesting way so they are easy to understand.

1. INTRODUCTION

Growth and development in early childhood under eight years are very important. It is because, at the beginning of the first years, the rapid growth will determine the quality of children in the future, so early

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childhood education is important to maximize children's growth and development (Hartawan, 2022; Purnamasari & Na'imah, 2020; Saripudin, 2019). Early childhood education is carried out by maximizing the level of achievement of early childhood development, where education is directed at the development of religion and morals, physical-motor, cognitive, language, social-emotional, and arts (Islamiyah et al., 2020; Wiranata, 2019). It is based on the fact that early childhood like to move, have curiosity, do experiments and creative self-exploration, have the power of innovation, and talk (Hartawan, 2022; Sulaiman et al., 2019). Along with growth and development in early childhood, learning in 21st-century students is essentially directed at mastering in-depth (cognitive) knowledge skills (Aminah et al., 2022; Syaputri & Afriza, 2022). It is intended so that learning provides many provisions for students to have abilities in terms of communication, collaboration, critical thinking in solving problems, as well as being creative and innovative, but in reality, learning has not fully accommodated the output needs of digital era education needs (Panzilion et al., 2021; Prayogi & Estetika, 2019).

The development of the 21st century directs education to carry out the learning process oriented toward the rapid development of Science and Technology, which is marked by changes in curriculum, communication media, and technology (Putra et al., 2021; Rahayu et al., 2022). Science and technology are used to build competence through an approach mainly centered on students with educators who remain active, especially teachers who are required to be able to use technology-based learning media, and the learning is useful for students (Husain & Kaharu, 2020; Norita & Hadiyanto, 2021). Early childhood education strives to adjust to learning that can stimulate other aspects of development according to the tasks of growth and development (Hadi & Sumardi, 2023; Sari, 2021). Providing direct stimulus will provide a more meaningful learning experience. It means that the use of digital resources must prioritize the active efforts of individuals in compiling their understanding. Learning planning in the 21st century early childhood is needed to obtain a learning plan appropriate to the achievement level of early childhood development (Apriyansyah & Kurniawaty, 2022; Husain & Kaharu, 2020). Management of learning is an embodiment of learning planning which should be measurable or always assessed for its success, known as 4C, namely Critical Thinking and Problem-Solving, Creativity, Communication Skills, and Ability to Work Collaboratively (Agusniatih & Muliana, 2022; Wulansuci et al., 2022). The success of learning in the 21st century is largely determined by the ability to understand the content of the subject matter, the characteristics of students, and the learning process (Nurazka et al., 2022). The characteristics of students are all the backgrounds that are brought when present in class before learning begins (Maulidah, 2021).

The reality shows that early childhood learning only partially works to the demands of 21st-century learning (Wulandari et al., 2020). The learning process only uses printed teaching materials, so it cannot maximize student learning (Nimatuzahroh et al., 2022; Rini et al., 2022). The need for digital teaching materials impacts children's slow growth and development process (Nana, 2020; Pujiati & Yulianto, 2021). One effort that can be made to overcome this problem is to apply media that is to the needs of children. One media that can be used is e-book media or digital books. An E-book is an electronic form of a book, which contains various content such as pictures, videos, and animations, accompanied by various interesting features (Andaresta & Rachmadiarti, 2021; Bayani, 2019). E-books in the learning process can make it easier for teachers to present material to their students, especially in the online learning process. It is because e-books have practical characteristics, are easy to use, and can be accessed anywhere and anytime (Liana et al., 2021; Silva et al., 2019).

The application of e-book media in the learning process will be more effective if it is accompanied by the use of a STEAM-based learning approach that can meet the needs so that children are prepared to face future challenges (Nasrah et al., 2021; Wulandari et al., 2020). It is important because they need a variety of abilities and skills, namely critical thinking, acting and behaving critically, being able to carry out mutually beneficial cooperation, and being able to be good, skilled in conveying and receiving messages (Agusniatih & Muliana, 2022; Imamah & Muqowim, 2020). STEAM-based learning is an approach to teaching and learning activities that prioritizes the relationship between science, technology, engineering, art, and mathematics (STEAM) (Dejarnette, 2018; Nasrah et al., 2021). The aim is to direct students to have skills in solving problems that arise during the learning process with more ideas while using technology and digital information (Imamah & Muqowim, 2020; Tabiin, 2020). If previously the teacher was the source of knowledge, he had to prepare teaching materials in modules, books, or student worksheets. But now, making student worksheets easily accessible via the internet, thus opening up opportunities for students to be creative and actively create new ideas.

The material for developing early childhood creativity through media application is one of the study program subjects in the Department of Early Childhood Islamic Education, Tarbiyah and Teacher Training Faculty, UIN Sunan Gunung Djati Bandung. By 21st-century learning planning, this course is the key to the growth of creativity for prospective teachers, especially in developing countries. Specifically to prepare Indonesian people to have the ability to live as individuals who are faithful, productive, creative, innovative,

and effective. Teacher creativity in early childhood learning is very important because it can create a more interesting learning climate for children, children's attention becomes more focused, and teachers can maximize digital use for this early childhood creativity development course. Students are directed to improve their ideas as prospective teachers in preparing learning in the digital era or the 21st century through integrating and utilizing technology, where technological developments are currently experiencing continuous progress so that students are ready and able to adapt learning to the needs of early childhood play. Understanding creativity, technology, and learning, the question is, how are students' efforts to create interesting learning media for their students in the future?

Several previous studies revealed that students responded positively to using e-book media in learning (Fauziyah & Anistyasari, 2020). The results of other studies revealed that students positively responded to using e-book media, stating that they felt more enthusiastic when learning to use e-books (Payadnyaa et al., 2022). Based on some of the results of these studies, using e-books in the learning process has received positive responses from students and students. In previous studies, no studies specifically discussed the analysis of student responses to STEAM-based e-book creation innovations in the Early Childhood Creativity Development course. So this research is focused on this study to analyze student responses regarding the use of book creators to fulfill digital learning media innovations.

2. METHOD

This study uses a qualitative approach with a descriptive analysis method, which is intended to understand the phenomena that occur. In this case, the phenomenon seen is the learning process through a digital e-book which is then interpreted by involving a research instrument in the form of a questionnaire. Data that has been interpreted is then presented descriptively. It is intended to provide an overview of the use of digital media for early childhood learning. This research began by observing a lecture activity project for one semester. From the observation activities, information was obtained regarding students' ability to design innovative learning plans for developing early childhood creativity through digital-based STEAM and how to make STEAM material content into book creators. The information needed is in the form of students' responses to the standards for making a book creator consisting of an introductory e-book design with short sentences, songs related to the theme, and steps for learning science, technology, engineering, art, and mathematics with short sentences, making videos youtube student science practice presented in the form of links and barcodes, as well as practical photos. The e-books used as material for analysis are e-books selected from one group's work. The sample in this study were students majoring in PIAUD UIN Sunan Gunung Djati Bandung who took the fifth semester Early Childhood Creativity Development course with a total of 54 students. The study's data was collected using observation, interviews, documentation, and questionnaires. The instrument used is in the form of a student response questionnaire to STEAM-based e-book media. The research instrument grid can be seen in Table 1.

Table 1. Student Response Indicators

No	Indicator	Answer Description
1	Knowledge of e-books E-book design	Regarding yes or no answers Regarding the e-book design is attractive, the design is professionally made, the design is comfortable to use, the design is according to the theme, the design is well organized
2		Using songs from YouTube, using homemade songs, using songs that match the theme, editing songs are quite good, and using songs from other sources
3	Songs in e-books	Regarding the design of attractive pictures, the essence of science material is understandable, the selection of songs is related to science material, children can follow the selection of play activities, and the science video tutorials are understandable
4	Development of creativity in terms of science	Regarding the attractive image design, the essence of technology material is understandable, the selection of songs is related to technology material, children can follow the selection of play activities, and video tutorials on technology can be understood
5	Development of creativity in terms of technology	Regarding the attractive image design, the essence of the engineering material can be understood, the selection of songs is related to engineering material, children can follow the selection of play activities, and the engineering video tutorials can be understood

No	Indicator	Answer Description
6	Development of creativity in terms of engineering	Regarding attractive image design, the essence of mathematics material can be understood, the selection of songs is related to mathematics material, children can follow the selection of play activities, the mathematics video tutorials can be understood
7	Development of creativity in terms of mathematics or mathematics	Regarding the attractive image design, the essence of art material is understandable, the selection of songs is related to art material, the selection of play activities can be followed by children, and art video tutorials are understandable

The data obtained in this study were analyzed through several stages, the first was data collection, the second was data reduction, the third was data presentation, and the last was conclusion. Data was collected through assignment results, namely e-book assignments and online surveys. Simplification of the data by selecting the best student group assignment is then used as the focus of the research. Presentation activities are carried out to describe the analysis results based on the survey.

3. RESULTS AND DISCUSSION

Result

In the early childhood creativity development course, students must be able to produce one of the media that teachers and parents can later use. Since learning for early childhood requires an interesting method, STEAM learning was chosen as the material for making e-books. It is because STEAM aims to increase students' interest, critical thinking, communication, and creativity in science and mathematics in a fun and more interesting way through technology, engineering, and art. In developing STEAM-based creativity, media is needed to increase learning innovation. One of them is by utilizing technology, information, and communication. The E-book is one product of the use of ICT. ICT has become an important element after the world of education has been affected by the corona outbreak (Covid-19), which has given rise to new habits of offline learning to visual learning styles. Information and communication technology is one of the challenges in the era of globalization, and information that needs to be utilized as an opportunity to enhance learning.

Based on the results of the data analysis that has been carried out, several findings were found in this study, including first, out of 54 students of UIN Sunan Gunung Djati Faculty of Tarbiyah and Teacher Training in the PIAUD Department, 100% of students know about book creators. From this provision, it will be easy for lecturers to provide explanations for making e-books and utilizing the tools available in the book creator. Book creator is equipped with tools to add files in documents, images, recordings, videos, and text. It makes it easier for users to make books according to their creativity. To make it look attractive, you can also use the Canva application to create images that will later become book backgrounds. Not only that, adding songs and videos can be easily added. If the video file is large, you can use a link that will later connect to YouTube or Google Drive. The display of the e-book creator application can be seen in Figure 1.
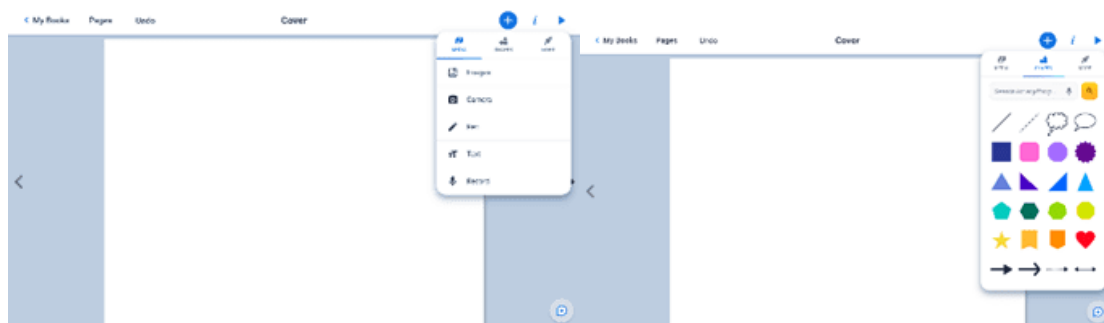

Figure 1. The E-book Creator Application

The lecture project ultimately resulted in 21 e-book works. The theme raised relates to the learning needs of early childhood, such as the universe, natural phenomena, vehicles, and others. The contents of the e-book consist of an introductory e-book design with short sentences, songs related to the theme, steps for learning science (science), technology (technology), engineering, art, and mathematics with short sentences, making YouTube videos student science practice along with barcodes, as well as photos of STEAM practice. Of the 21 student works, an interesting e-book was selected, which could later be

developed as an innovative learning media. The selected e-book is Development of STEAM-Based Early Childhood Creativity Nature Theme, Wind Sub-Theme. In the e-book group, the two themes of the universe, the sub-theme of wind, are made about the principle of learning to play while learning.

The second finding shows that 83.3% of the songs used are according to the theme. Meanwhile, 66.7% of the songs used in this e-book come from YouTube. Meanwhile, 22.2% used self-made songs, and 22.2% edited the songs well. Furthermore, as much as 3.5% use songs from other sources. In this e-book, the songs chosen are the wind as a Source of Energy (p.02), my balloon (p.12), and The Song of the spinning fan (p.22). The lyrics section provides text using English and Indonesian (p.16). The song activity selection display can be seen in Figure 2.

Figure 2. Selection of Activity Songs According to the Theme

The third finding shows that science is the first STEAM-based early childhood creativity development activity. Science in early childhood is a learning activity that begins with finding out about the universe systematically, which is adapted to the desire of students to find out and the ability to solve life problems according to their age, so that by providing science learning from an early age can train children in using the mind, strength and honesty so that the child has the readiness to go to a higher level of education. Also, through science, children can bring up their curiosity to solve problems and actions such as observing, thinking, and making connections between knowledge or experienced events. Life cannot be separated from science, creativity, and social activities in early childhood. Therefore education through STEAM activities stimulates children with fun science activities that encourage students to explore the natural surroundings. Based on the results of the science creativity development questionnaire, it was found that the e-book innovation of early childhood creativity development in this science play activity, 63% of students stated that the e-book image design was made attractive, 66.7% said the essence of the science play activity material was understandable, 51.9% of the selection of song material is related to science material, children can follow 57.4% of the selection of science play activities, and 51.9% of science tutorial videos can be understood. The appearance of the development of scientific creativity can be seen in Figure 3.

Figure 3. Development of Scientific Creativity (Science)

The fourth finding shows that the second play activity for developing STEAM-based early childhood creativity is the use of technology. Technology is used as a medium for conveying interesting and interactive learning messages. In this non-stop development, the world of education cannot escape the need for technology, which ultimately changes learning patterns for developing creative and innovative skills. Based

on the results of the questionnaire, it was found that e-book innovations developed early childhood creativity in this technology activity. 59.3% of students stated that the e-book image designs were made attractive, 70.4% stated that the essence of technology material was understandable, 57.4% stated the selection of songs related to technology material, 61.1% of the selection of technology play activities could be followed by children, and 51.9% video tutorials of technology play activities can be understood. The display of technology creativity development (Technology) can be seen in Figure 4.

Figure 4. Development of Technology Creativity (Technology)

The fifth finding relates to the development of engineering creativity. Engineering is the ability to engineer technological developments. Kipper in Siron states that early childhood engineering abilities must be developed more deeply. Engineering content can be the main guide in learning because the field emphasizes psychological aspects and social interactions, which are important factors in learning—starting with identifying the problems faced and then looking for solutions. For example, students try to transfer water from one bucket to another using a dipper, then build thoughts and ideas by looking for other tools that can be faster, for example, using a hose and water pump. It is where aspects of cognitive, language, emotional, physical development, motor, and art are grown. Based on the results of the engineering creativity development questionnaire, it was found that the e-book innovation of early childhood creativity development in this engineering activity, 53.7% of students stated that the e-book image design was made attractive, 72.2% stated the essence of engineering material was understandable, 50 % of song selection relates to engineering play activity material, 57.4% of engineering play activity selection can be followed by children, and 64.8% technology play activity video tutorials can be understood. The display of engineering creativity development can be seen in Figure 5.

Figure 5. Development of Engineering Creativity

The sixth finding relates to the process of art development. Art stimulation in early childhood is very important in developing the basis of inventiveness, creativity, imagination, and personality of children

according to their stage of development. Art development is very important for children's emotional development. This skill can greatly improve children's ability to understand other people's feelings so they can act quickly. The level of achievement of early childhood artistic development consists of the level of achievement of various artistic works and skills, such as drawing, painting, finger painting, finger stamping, origami, meronce, musicality, various expressions of gross motor movements, fine motor skills, crafts, various mini performances drama, singing, telling stories, dancing, and various processing of objects that can be used into other goods. Based on the results of the art creativity development questionnaire (figure 7), it was found that the e-book innovation of early childhood creativity development in this art activity, 66.7% of students stated that the e-book image design was made attractive, 66.7% stated the essence of art material understandable, 55.6% of song selection relates to art playing activity material, 66.7% of the art playing activity selection can be followed by children and 68.5% of art playing activity video tutorials can be understood. The appearance of the development of artistic creativity can be seen in Figure 6.
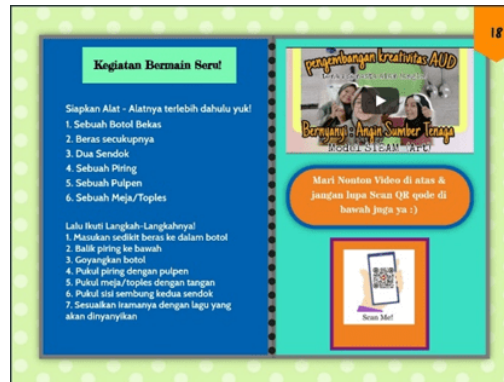

Figure 6. Development of Artistic Creativity (Art)

The seventh finding relates to mathematical creativity. Mathematics is important to equip early childhood to think logically, systematically, critically, analytically, full of new ideas, and social skills. Developing the concept of learning mathematics in early childhood can be done, among other things, by developing the concept of numbers in children, developing concept patterns and relationships, developing the concept of geometrical relationships, developing the concept of measurement, developing the concept of collecting, organizing and displaying data. Based on the results of the mathematical creativity development questionnaire (figure 8), it was found that e-book innovations developed early childhood creativity in this mathematical activity, 57.4% of students stated that the e-book image design was made attractive, 79.6% stated the essence of mathematical material understandable, 53.7% of song selection relates to math play activity material, 64.8% of math play activity choices can be followed by children, and 59.3% math play activity video tutorials can be understood. The display of mathematics creativity development can be seen in Figure 7.

Figure 7. Development of Mathematical Creativity (Mathematics)

Discussion

The response from students regarding the creation of this e-book proves that innovation to develop learning media is needed in early childhood learning. Learning media is one of the teaching aids for teachers to convey teaching material and increase student creativity and attention in the learning process (Husain & Kaharu, 2020; Norita & Hadiyanto, 2021). Learning media can make teaching and learning more effective and efficient and establish good relations between teachers and students (Hadi & Sumardi, 2023; Sari,

2021). Learning media contains information that can be in the form of knowledge or as a means for students to carry out learning activities (reading, observing, trying, working on questions, answering questions, etc.) (Bariah, 2017). As prospective teachers, students must realize that the teacher's role in education is very important. It is because smart, creative, and innovative students are the results of learning carried out by teachers creatively and innovatively; As a result, creative teachers will also produce creative students (Setyawati & Ary, 2023). The innovation aims to provide efficient and effective time regarding the target of the maximum number of students with the maximum possible educational outcomes (according to the criteria of the needs of students, society, and development) by using human resources, money, tools, and time in the smallest amount (Ansori & Sari, 2020; Maulidah, 2021). Something can be called an innovation if it is profitable. According to values, the level of complexity that can be tolerated can be tested, and the results can be observed.

Making an e-book is an innovation because it can provide benefits for students. It is because, through the project of making e-books, they understand that creativity is needed in making e-books for early childhood. Creativity is needed because you have to be able to combine the selection of song material, design, and learning content. In addition, through the project of making e-books, they have become more trained to create effective and efficient learning media. Making e-books, besides providing benefits for students, also align with values. The value in question is the value of education. Educational values must be instilled and developed in a person (Liana et al., 2021; Mawarti, 2017; Silva et al., 2019). The educational value contained when students create e-books is the opportunity for students to compile STEAM-based material, the opportunity to process applications, and the opportunity for students to develop content. From this, they can develop their potential to become creative and innovative. The book creator application used to create e-books is an easy-to-use application. Anyone can use book creators anytime and anywhere (Andaresta & Rachmadiarti, 2021; Bayani, 2019; Tuminah et al., 2022). However, one thing that needs to be considered in making e-books is the need for the internet to access the book creator application. Therefore the result of making an e-book is real. Real in the sense that there is a form. The form of an e-book can not only be used using a laptop or cellphone but can also be printed.

In e-books created by students, if later the e-books are downloaded and printed, the audio and video can be accessed via a barcode which can later be scanned and connected to the link. The creation of e-books by students has never been tested on teachers or students. Because the use of e-books for teachers and students needs to be preceded by a validity test by media experts. The innovation for making e-books aims to give students the experience of creating books. As for giving questionnaires to students related to e-books that have been used as examples, students will be able to appreciate the work of friends and can become material for improving e-books (Azizah & Budijastuti, 2021; Susilawati & Rusdinal, 2022). Apart from that, student responses can also be used as evaluation material for lecturers to introduce e-book creators to teachers or parents of students (Aftiani et al., 2021; Hariono et al., 2021). The results obtained in this study are slightly different from those of previous studies, where previous studies revealed that students responded positively to using e-book media in the learning process (Fauziyah & Anistyasari, 2020). The results of other studies revealed that students positively responded to using e-book media, stating that they felt more enthusiastic when learning to use e-books (Payadnyaa et al., 2022). At the same time, the results of this study indicate that students have been able to design and use e-books well, especially to assist the learning process of early childhood.

4. CONCLUSION

Based on the data analysis and discussion that has been carried out, it can be concluded that there is an innovation in the creation of e-books through book creators. Innovation is reflected in the material equipped with reading texts, video tutorials for doing works, and songs, making it easier to teach in early childhood education units. The results of a survey of group two book creators with the theme of the universe sub-theme of wind showed that student innovation in making this e-book included student knowledge about book creators, students' ability to design book creators interestingly, and students' ability to develop creativity through science, technology, engineering, art, and mathematics in a more interesting way so that they are easy to understand. The creation of STEAM-based e-books is a project that is expected to provide insights and new learning techniques for prospective educators who want to constantly innovate to discover new worlds or learning that is full of creative ideas and innovative solutions.

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