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The impact of TikTok videos in creative designs of house plans in civil technology's practical assessment tasks

Thokozani Isaac Mtshali[1]✉

[1]*Department of Technology and Vocational Education, Tshwane University of Technology Soshanguve North campus, Pretoria, 0001, South Africa*
✉thokozanimtshali63@yahoo.com

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Abstract: The internet bandwidth has drastically improved since most schools have introduced multimodal teaching and learning. This allowed many students to explore various online learning platforms in search of expanded knowledge and skills. Like many other teenage students, Civil Technology students ventured into TikTok videos to learn and share ideas about designing house plans which they used to do a compulsory practical assessment task (PAT). This study explored students' experiences on how TikTok videos have opened doors for creativity in designing house plans, granny flats in particular. A qualitative research method was used, and a case study design was used for sixteen (16) civil technology students who were purposefully sampled to become respondents to the questions posed. Focused group interviews and document analysis were used to gather data and thematic as well as content analysis were used to analyse the sets of data. This study found that the students acquired more creative ways on TikTok to design single-storey house plans. They learned that they could design domestic houses without bricks or timber walls, but also glasses or shipping containers through 3D design. This increased their spatial ability to understand how house plans could be designed using various materials. Thus, this study recommends for habitual use of TikTok videos and live sessions to learn civil technology-building concepts to advance creativity when doing practical assessment tasks.

Keywords: TikTok; civil technology; practical assessment task.

A. Introduction

The proliferation of social media and e-learning has led to the emergence of some of the overarching socio-educational platforms such as TikTok. TikTok has over 1.53 billion users as of the first quarter of 2023, making one billion of those monthly active users. This includes students, academics, entertainment content creators, live streamers and etcetera

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coming together to share information amongst other things (Zhang et al., 2023). This high usage of the internet has also been strengthened by the move to multi-modal teaching and learning by schools, colleges and universities in the last two years, where the use of Google Classrooms, Skype, Brightspace, Blackboard and many other learning platforms has skyrocketed than ever before (Guzzo et al., 2023; Masilo et al., 2021). The move by the various institutions of learning cascaded down to students exploring various platforms for different reasons including scouting for creative ideas, global connections, and general popularity. It seems that young people are more disposed to TikTok for informal education which eventually influences the creative capabilities they bring into their classrooms (Agustiningsih et al., 2022).

This study took an opportunity to explore how Civil Technology students use the ideas learnt from TikTok to design house plans, a granny flat in particular. The idea was that students should find houses designed in different materials such as wood, masonry concrete, glass partition or corrugated house plans. It was envisaged that students would indicate the context in which the chosen building materials were befitting. For example, it would be expected that if a student chooses to use glass partitions in a pre-existing multi-storey building, the reasoning would be that glass partitions allow maximum natural light to pass through the building. Also, visual learning assists students to come up with such reasons in their designs.

The general understanding of visual learning is that it is an assimilation of information from visual formats like videos, images, cartoons, diagrams, simulations, movies, games, and flashcards (Rodger et al., 2009). These visual formats allow students to receive and understand information quickly and be able to contextualise it within their setting. According to Raiyn (2016), about seventy percent and more of all information processed by the brain is derived from visual formats, making it better for students to know how best they could transfer that information to their current living conditions. It is in the views of Fiallos, Fiallos and Figueroa (2021) that TikTok plays similar functions in students' brains. These scholars claim that TikTok provides endless opportunities for knowledge dissemination in that besides showing entertainment videos, it gives young people access to a new format of short educational videos created by expert authors.

Now, there is a case to believe that Civil Technology students can benefit from Tiktok videos when engaged in practical assessment tasks (PAT) for structural design. For instance, PAT is a process of training students to gain hands-on skills and knowledge of authentic vocational technological problems (Magolego et al., 2022). This means that whatever simulation of building structures that students may want to explore, they can view various videos to augment their creative design skills. For instance, TikTok has the hashtag *#learnontiktok* which provides students with various experiments for science and technology among others. This hashtag handle gives students ideas on how to build or how building structures were erected on flat or mountainous surfaces. They show the kind of materials which are used and building fixtures. This helps students to understand the design dynamics in the built environment.

TikTok is one of the platforms that has opened its doors to assist students in identifying project ideas, collaborating during the learning process, curating, and sharing any results of their project (Burns, 2021). It also is an easy-to-find online platform for diverse people and activities including entertainment and education. It offers a rare opportunity to connect with people all over the world (Baker & Baker, 2023). Most information that could have otherwise been available through formal education, is now available for all to use. Most people get instant answers to many things they have been meaning to understand over the years ranging from culture, behaviour, education, geography, climate, biology, chemistry, mathematics, languages, and planets among other things.

The short and carefully edited TikTok videos are most favourable for streamers who want instant ways to cook, lose weight or gain muscles, cloth sewing, health tips, drawing and vocational and technical training. Also, so many teachers have gained followers by demonstrating easy ways of understanding difficult topics for most students at primary, secondary and higher education institutions. This gigantic information-saturated platform has got algorithms for almost all needs of everyone, making the need to seek drawing ideas a pertinent issue.

Due to the availability of new channels of communication made possible by visually appealing content, TikTok videos are changing the way skills are taught and acquired. Not so long we were introduced to robotics as an alternative to scarce skills. However, we find

"life hacks" videos which are simple manual skills that one could use. Through TikTok, the world is no longer as we perceived it to be. Many people are still sharing important skills that might have been considered ancient and unappealing to current living standards. However, more people are coming on board to share habits that they have not changed over the years which boosts the morale of those who thought they are far below world living standards. Hence, it is important for teachers to quickly think about ways to incorporate TikTok videos into pedagogical approaches to improvising whilst maintaining quality education standards.

What sets TikTok videos apart from many other social platforms existing, is the videos' background music representing the core message that users want to convey. For instance, if users want to show off a house created by artificial intelligence, they can use the sound of a real structure being constructed. Contextualize the view to their particular geographic location, it also enables other users to use different sounds for the same view. This also happens because background sounds have the power to tell stories and deliver messages. These are some of the evidence of what TikTok offers to students. Thus, the researcher argues that it is fit for learning processes. Thus, Analyzing the ways TikTok videos assist Civil Technology students to creatively design house plans for practical assessment tasks and finding out the implementation of TikTok ideas to creatively design house plans for practical assessment task for the students are the objectives of this study.

B. Method

This study adopted a qualitative research approach to understand ways in which *TikTok* videos assist Civil Technology students to creatively design house plans for practical assessment tasks. Stahl and King (2020) understand this approach as a phenomenon of collecting and analysing text-based, video, or audio-saturated data to understand the concepts, opinions, or experiences of participants. It was indeed the intention of this study to understand students' experiences on the TikTok videos they watched to gather in-depth insights into creatively designing house plans for their PAT. The subjects of this study were a group of Civil Technology students who were tasked to design granny flats as part of their house plan designs. The location of this research was conducted in Gauteng Province in the Tshwane district, South Africa. The research was

conducted for 3 weeks, starting from September 6, 2022, to September 23, 2022. This was a case of Civil Technology students engaged in continuous assessment tasks of their learning program. According to Stake (2013), as supported by Yazan (2015), a case study is a method that is used to generate an in-depth, or multi-faceted understanding of a complex issue in its real-life context. This study though, is not concerned with a multifaceted but single rigorous understanding of a real-life contextual issue.

To effectively engage with the matter under scrutiny, this study used a non-probability sampling method and selected participants subjectively. According to Vehovar, Toepoel and Steinmetz (2016), non-probability sampling is one of the fastest and most economically friendly sampling methods for collecting data. This study took an opportunity to sample students who were engaged with TikTok videos, and this saved a lot of data collection costs for the researcher, consequently engaging the researcher in convenience sampling. Convenience sampling is a non-probability sampling method where units are selected for inclusion in the sample because they are the easiest for the researcher to access. Indeed, it was easy for the researcher to reach participants as they studied close to where the researcher hustles.

Data was collected through focus group interviews and document analysis. Focus group interviews are essentially planned discussions with a relatively small group of people conducted by a moderator or organiser. They assist the researcher to determine the general views of the group on a particular research matter. Thusly, the group interviews were scheduled for fifty-five minutes, although they lasted more than an hour as students shared more about their experiences and favourite influencers on TikTok. This was happening also because the participants were provided with a full explanation about the intention of the study. This study further engaged in document analysis to explore how students implemented the knowledge gained from TikTok to actual practice. According to Bowen (2009), document analysis involves evaluating physical or soft documents to interpret them, gain an understanding of their meaning and develop upon the information they provide, thus physical documents of house plans in elevation and perspective approaches were analysed

Thematic analysis was used for the focus group interviews in this study because, like many other qualitative analytical approaches, it allowed for data sorting and sifting to help

find common patterns or relationships (Braun & Clarke, 2012). It also allowed the researcher to work with a variety of research topics and conduct analyses on both large and small amounts of data (Lester et al., 2020). This is supported by Clarke, Braun, and Hayfield (2015) that this technique is used to find patterns in the data, analyse them, and interpret them as themes. Thusly, because of its accessibility and adaptability, the researcher chose thematic analysis as a technique for data analysis (Braun & Clarke, 2012).

For the documents (civil drawings) which were analysed in this study, content analysis was deemed relevant. Although Krippendorff (2018) assert that document analysis is used to determine the presence of certain words, themes, or concepts within some given qualitative data (i.e., text), this study used content analysis concerning the concept of the drawing. The nature of drawings is that they are non-verbal or contain written text, but those who understand the drawing's meanings can subsequently analyze its contents, thus the contents of Civil drawings were analyzed.

Most researchers find it difficult to trust and validate the credibility of qualitative research findings particularly when the researcher does not show the validation steps of the data. In this study, the researcher followed some advice by Rose and Johnson (2020) that to ensure that the findings are believable, applicable and credible, the researcher should do member checking, check with a critical friend, and provide a rich description of events and multimethod strategies among other things. Thusly, below the researcher unpack how the systematic rigour of the research was used to invoke trustworthiness.

According to Schmidt (2017), the credibility of findings can be achieved when the principal researcher verifies the findings of the research with the participants. Henceforth, the researcher started with member checking where he met with the participants during the investigation and design process phases of PAT to check if the data given to me was the true reflection or not, they gave me a green light. Thomas (2017) recommends this practice because participants get an opportunity to verify their responses. The researcher also subjected the findings to a critical friend. According to Noor and Shafee (2021), the role of critical friends in research is to assist the researcher with the elimination of potential biases in reporting by asking questions that can affect the research process. In this case, a critical friend was a scholar of the same discipline in a different institution.

As a matter of principle in case studies like this one, the provision of rich thick descriptions is necessary. Hadi and José (2016) state that it is required for a researcher to give an extensive set of details about a particular research process so that it can be evaluated by the reader and see if findings could be transferable to similar contexts. Hence, the researcher ensured that a rich thick description was provided. Although the norm in qualitative studies is that researchers use multiple data collection methods, MacMillan and Schumacher (2014) state that each researcher has one significant method to collect the appropriate data. Thus, focus group interviews and documentation were appropriate for the data collected in this study. Participants were permitted to ask for clarity of data whenever they wanted and see all transcribed data. All this was in line with Hasan et al., (2021) view of ethical conduct in research and that the researcher treated participants with respect and dignity.

C. Result and Discussion

1. Ways in which *TikTok* videos assist Civil Technology students to creatively design house plans for practical assessment task

a. TikTok videos give rich background about house various house designs

Designing building drawings requires a lot of spatial abilities because it involves aesthetical value, and artistic and expressive requirements (Fan & Zhong, 2022). Emerging and experienced architects must understand that every design one makes should portray a spatial relationship to the natural world and other societies. The climate and geographic status of where one builds are some of the pertinent factors a designer should know. As a consequence, a group of students were asked how TikTok videos inspired them in the kinds of designs they did and this is how they responded:

> For the first few seconds, the videos start by showing us the final products of houses built with, glass partitions, containers or timber, once we are hooked, it narrates for us how the geographical environment depicted their choice. I think that approach helps to have many viewers of that content because not everyone watches TikTok for that purpose." (O.A., personal communication, September 19, 2022)

Other students added that:

> We now know that when you design a house in hilly surfaces, you should consider pile or stepped foundations. This should also be displayed in a sectional view of the house plan. We are always taught to draw house plans using the South African drawing standards. This limits us because it does not mean we are going to be engineers of South Africa only. (S.M, personal communication, September 19, 2022).

There seems to be a consensus that TikTok videos expand students' knowledge about why other countries build houses in a certain way. For instance, it is through this kind of social media platform that the collapse of buildings in Türkiye was made known. For civil engineering students, it sparks endless debates on how the construction of tall buildings was done and if the designs were suitable for the kind of landscape in which buildings were erected. Thus, TikTok videos give a front-row seat to understand that students should not only design to build, but they should also consider background checks of whether their designs could withstand natural disaster pressures. Consequently, common reasoning would concur with the students' views that in civil engineering, different foundation types are meant for different geographical positions of buildings. Shah et al., (2018) testify that structural designs made for hilly terrains should be more creative because vegetation suffers a great deal during construction execution, this includes vibrations for rocks blasting. It is thus important that all designs take into account all these factors when drawing house plans.

b. Fit-for-purpose material

One of the cardinal rules in the built environment is that designers and contractors should ensure that designed drawings are manifested from the date on which the project is undertaken up until the date on which the works are handed over to the client (Dindi, 2022). These are some of the sentiments that students shared about TikTok videos, see the excerpt below: *"Through the videos, we have learned that houses are not only built using concrete bricks and hollow blocks. We can design granny flats using shipping containers."* (T.M., personal communication, September 19, 2022). *"Also, these ideas we got from a website called www.containify.com."* (T.M., personal communication, September 19, 2022).

There are cost-effective and recyclable materials which can be used to build houses. What is missing though is a blueprint to guide architectures and emerging house designers about building specifications. For instance, when students draw a

sectional view of a house plan, they would indicate that the thickness of a wall is 220mm, but in instances where students design a plan consisting of corrugated iron sheets as walls, what are the standard building dimensions for that? Again, this TikTok brings about ground-breaking thoughts on the building drawing regulations.

c. Increasing spatial skills

It is said that spatial skills are the driving force of technological and engineering education. Triutami et al., (2021) supporting McGee (1979) states that students can improve their spatial skills by blending physical exploration, hands-on activities, spatial talks and explicit instructions. Given the type of explorations this study engaged in, spatial talks were perceived as a relevant component for the enhancement of spatial skills. Students indicated that after watching TikTok videos they developed ideas on how the designs could apply to their society, see the excerpt below: *"When I saw videos of those shipping container flats, it dawned on me that one can have double story house or flatlet without the stress of rib-and-block. It is also challenging to draw those plans".* (R.M, personal communication, September 19, 2022).

Another testimony is that students saw the videos as cutting down all construction costs that they could incur if they were to build a flatlet. Spatial abilities in this instance, came when students transposed what they learned and picture it as a complete project within their real-life context.

d. Creativity

Creativity is one of the principal objectives of Civil Technology. It is what students should possess every time they engage with PAT. Creativity is regarded as imperative in designing products (Jagtap, 2019). Students engage in a phase where they need to come up with at least three creative ideas for their PATs, and in the case of this study, students indicated that they have become more creative in designing house plans than before, see the extract below: *"I think textbooks has limited us to many design possibilities, but now we have to see what other do in various countries to make their house light and aesthetical."* (O.A, personal communication, September 19, 2022).

So, this group of students used their TikTok building designs experiences to draw inspiration for the house plan drawing ideas from different parts of the world as opposed to going to Google, magazines and textbooks to find pictures. We have come to

know how much audiovisuals are preferred to reading long documents among youth. Students find it amusing when they learn with sound and different visuals than spending time on screen and in textbooks reading text (Baron, 2021). They seem to prefer interactive engagements with new people to gain insight into a lot of things-moreover, they enjoy making image-based conversations (Thompson & Beene, 2023). Like many other teenage students, Civil Technology students ventured into TikTok videos and their live sessions to learn and share ideas about designing house plans which they used to do a compulsory practical assessment task (PAT). This study followed students' experiences on how TikTok videos have opened doors for creativity in designing house plans.

2. Students implementation of TikTok ideas to creatively design granny flats.

Students used TikTok handles to explore different house designs such as the one shown in Figure 1, with associated hashtags for various house plans.

#housedesign #house #architectural_designs #designvilla #country

Figure 1. TikTok house plans ideas

After having explored different house plans ideas from the handles depicted in Figure 1, students implemented the creative designs to draw granny flats using elevation and perspective methods, see Figures 2 and 3 below.

Figure 2. Granny flat design – elevation approach

Figure 2 shows a granny flat using building material, although students were unable to be completely innovative, they indicated wall types (double hatch) on the floor plan, which indicates the kind of bricks to be considered, the distribution of windows and the position of the door entrance. The drawing also shows how the sectional elevation of the granny flat should look from the foundation until the upper wall level. The following figure (Figure 3) shows how students attempted to draw the granny flat in perspective format.

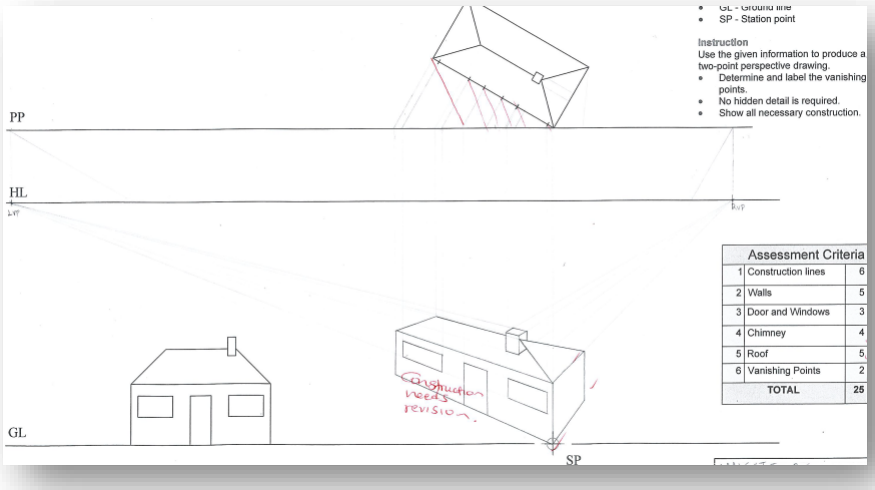

Figure 3. Granny flat-perspective format

Having used Computer Aided drawing to design the top view, side view, station point, picture plane, ground and horizontal, students had to attempt the same design using the perspective approach. As can be seen, students could not adequately draw the flat and show properly the roof level. Nevertheless, it may be argued that students' cognitive development was gradually improving as using TikTok for this purpose was their very first attempt.

Acknowledging that a student is an active agent in the process of acquiring knowledge and skills is a major step for letting students create new knowledge against old and test scientific principles that are no longer relevant to learning. Jean Piaget's cognitive development, particularly the formal operational stage acknowledges this fact. Manipulation of known information to diversify and form new is encouraged by this cognitive development stage. This study discovered the relevance of this stage in those students who designed their granny flats because they were required to be fast-thinking, sophisticated and advanced and TikTok videos gave students that advantage. They thought about abstract and complex ideas and use logic to come up with creative solutions to problems. According to Piaget (1972), skills such as logical and deductive reasoning as well as systematic planning also emerge during this stage.

Moreso, students' formal operational stage is influenced by conceptual balance which is concerned with the logic of where to apply forces to obtain balance in structures. When it comes to Civil Technology, a student with conceptual balance should demonstrate an understanding of how houses become stable. Students need to have a background in how structures are built, their purpose and how to avoid potential collapse.

When Piaget was trying to explain conceptual balance, he asked children to imagine where they would want to place a third eye if they had one. Students had to imagine a place in their body to place an eye that would give a fair viewing chance just as two eyes do. This concurs with how conceptual balance is construed in this study.

This study also espoused Piaget's deductive logic as the ability to know which materials could best be used for every house a student designs. If a student is required to design a house that will be erected in wetlands, there are building materials a student need to consider for that house – which would resist the moisture content. Piaget believed that deductive reasoning requires the ability to use a general principle to determine a

particular outcome. As seen in Figure 2, the students' granny flat had a normal concrete foundation, and the position of windows and a door showed that deductive logic was achieved.

Creativity was also emphasised in Piaget's formal operational stage through the lens of "abstract thought". Abstract concepts occur when students begin to consider possible outcomes and consequences of actions. This type of thinking is important in long-term planning. As students become conscious of their understanding of their thought processes, they develop metacognition skill which essentially guides their actions. Thusly, in Figure 3 students attempted to use draw the granny flat in a double-point perspective drawing approach to indicate ability to be creative. This was also embedding Spatial Visualisation Skills (SVS).

Popularly known as visual-spatial ability, it is a mental capability or intelligence to manipulate and think in 2-dimensional and 3-dimensional ways (Triutami et al., 2021). McGee (1979) propounds that a student who possesses such mental intelligence can mentally move objects mentally and imagine them from different views. Although SVS is said to be achieved through a test, it can be argued that logical reasoning can provide similar probabilities to think that one has SVS. For example, as seen in Figure 2 going to Figure 3, students use their SVS to show how the granny flat drawn in elevation and ground floor could look when drawn in perspective. This is similar to the analogy that if a student sees a house built on a hilly surface and he or she is given its floor plan to predict foundation designs, he or she can have logical reason in drawing a stepped or piled foundation to stabilise the flat surface of a place with Natural Ground Levels (NGL)s at different inclinations.

There is widespread evidence that spatial reasoning can be developed at any age from early childhood to adulthood (Hawes et al., 2015). Studies have shown that training can enhance visualization skills in a relatively short time. Many research studies have found that the spatial ability of an individual can be improved using effective instruction and digital or computer-based programs among others (Francis et al., 2016). Hence, figure 2 and 3 are a testament to students' attainment of SVS.

According to Boys (2022), spatial competent students are those who do not learn by memorization but learn by imagining ideas. Whenever instruction is given, they need extra

thinking time to reflect on what they were taught and how it could be transferred to another context. They have an imaginary friend whom they share a lot of stories with, and this assists them to cope with whatever information is before them. Hence, the implementation of ideas taken from Figure 1 and transferred to Figure 2 and 3 gives this study to assume that students had gained some level of spatial competence as assisted by TikTok videos..

D. Conclusion

To reiterate, this study was concerned with sharing students' experiences on how TikTok videos assisted them to be creative with house plan drawings in the Civil technology practical assessment task. This study found that the sampled students benefited from various hashtags or pages where building drawings were shown. They learned better because the videos had sounds that invoked their creativity and spatial skills among other things. They also learned that house plans go beyond designing a flatlet of concrete material. Glass partitions and shipping containers were a possible inclusion in the building. However, they did not know how to represent them through a sectional house drawing. This study recommends flexibility in using mobile gadgets such as cellular phones in classrooms and allows students to explore various social media platforms to expand students knowledge and skills. Many schools have kept a no cellular policy in their schools for many years to the detriment of students exposition to quality knowledge and skills. This study advises such schools that it is no longer sustainable to restrict learners to learn with their gadgets, schools must regulate the usage policies. This can work as many platforms restrict content that can be consumed by students because of their age.

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