A Reflection for Art & Design Learning for Digital Natives

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Abstract
Education cannot be separated from rapid technological advances. One of the new paradigms in education is the use of internet network technology. This also applies to education in art and design in Indonesia. During the pandemic, the acceleration of the digital transformation of universities in this field is trying to adapt. Despite dealing with Generation Z who are part of a digitally literate society, the form of learning design seems to be shifting. Today's technology has changed the method of learning in art and design. The use of technology has become part of the creative process. Currently, they are dealing with changes from the physical form to non-physical, hand drawings into digital drawings, real practice into virtual simulations, access to cloud storage, and exhibition of artworks in virtual spaces seems to be today's normality. Higher education in the creative field is one of the important institutions that will have an impact on the creative industry in developing countries such as Indonesia. Therefore, this phenomenon needs to be explained clearly. By conducting a survey of art and design students with a certain generation age category, literature studies, and interviews this paper attempts to describe how these digital natives respond to today's art and design learning. These findings can be used as initial input for further research in future art and design education.

Keywords: Creative Process, Developing Country, Technology, Generation Z, Virtualisation

Introduction

Technological interference in the fields of art and design is undeniable. As a tool, the involvement of digital technology has been applied in designing or creating artwork in this field for a long time. Now in the field of art and design, internet technology is also used in lectures. We witness this especially when the progress of the internet reaches its maximum capacity. For example, during the pandemic, we have seen how this ability is tested and has changed how it plays a role in learning, especially in art and design. Now, as students who are generation z, namely the generation called digital natives, technology has become a part of life and has even become an extension of how they carry out all activities. According to researchers this has more or less changed the method of learning and this needs to be studied more deeply so that learning can be in accordance with the current generation.

In Indonesia, the creative sector has become the spotlight in the country's development. Ministry of Tourism and Creative Economy Indonesia led by Mr. Sandiaga Uno in October 2022, stated that in Indonesia the creative sub-sector is important to develop. Seeing the very dynamic development of the creative economy today. In general, the creative economy is an industry that utilizes creativity, talent, and ability to create prosperity and jobs for many people. Potentially, the creative industry is one of the economic commodities that has recently been declining due to the Covid-19 pandemic. Moreover, the potential of natural resources in Indonesia is very large, causing the potential for the creative economy to be easier to develop.

Regarding generation z and its relationship with economic growth, the ministry released statistical data. The creative economy has quite promising potential to support the national economy. The Gross Domestic Product (GDP) of the economy that arises from creative ideas has reached IDR 1,009 trillion in 2017, an increase from the previous year of IDR 922.59 trillion (Network, 2018). With this data, it can be concluded that this generation plays an important role in the country's economic growth, so that progress in education and learning in higher education for this generation is important to explore more deeply.

Digital Natives, people born after 1980, are the children who have grown up in a world surrounded by and using computers, video games, digital music players, video cams, smartphones, and all the other modern technological tools. They are the product of the new culture that has emerged as a result of the aggressive penetration of digital technology and they are all ‘native speakers’ of the digital language (Kivunja, 2014; M. Prensky, 2001). The learning process undergoes changes that also characterize the generation of learners. Moreover, In the field of art and design, this process creates a new reality between the teacher, the learner, and the work created in a virtual environment. In addition to being used as a tool in creating works, digital technology, and the internet have also changed the way of the creative process for art and design students as digital natives. During the past pandemic, it can be noticed that how unique digital natives were in their creative process.

Unlike general theory courses, art and design use a lot of studio practice-based learning methods. A method that uses a lot of practical activities in studio classes that require direct face-to-face supervision of teachers to students, or between students. This method has long been applied in the creative field (Boling et al., 2016). When we move to technological advances in learning, of course, this affects the process in a virtual studio (Agrawal, 2009). In the last decade, we can see many students using this advanced technological tool. For example the development of a learning management system (LMS) in higher education,

teleconference applications which are increasingly commonly used for lecturing, use of web-based applications for design and collaboration, storage of learning data in the cloud, virtual presentations, use of AR and VR, and also the presentation of works in form of virtual exhibitions. The focus of this research is to explore how art and design students learn in this virtual studio environment, and how these conditions affect their creative process.

Literature Review

Digital Natives

Many researchers give terms and discussions for generations that are related to digital technology. Some call it the net generation (Tapscott, 2008), digital natives and the previous generation are called the digital immigrant's (M. R. Prensky, 2010), or in general, we often hear the term Z generation (Howell, 2012), or as simple as the digital generation (Jukes et al., 2010), or the popular term in Asia as the strawberry generation (Schott, 2008)which is more related to social issues. In this study, the researcher took the term put forward by Prensky which has a lot to do with the discussion of learning and education.

The term Digital Natives popularized by Marc Prensky (2001) said that this generation has its uniqueness from the previous generation. The most obvious difference from the previous generation is the difference in the way of thinking and how to use the mind to process information. Prensky also mentioned some of the most striking characteristics, namely their relation to technology, that they can adapt quickly, are highly dependent, and also really enjoy the online environment. In Indonesia, the population of Generation Z ranks first, which is 27.94%. This also builds the condition of the Indonesian economy, that this generation is the biggest actor and consumer.

The characteristic concept of digital natives is the most obvious difference from the previous generation is the difference in the way of thinking and how to use the mind to process information. The main characteristics are; Active in expressing self-identity; having broad insight; loving freedom; wanting to have control; being dependent on technology; enjoying the online environment; having the ability to adapt to new technologies & multitasking ability (M. R. Prensky, 2010). This characteristic has been widely discussed by several researchers. Especially regarding behavior towards the use of digital technology, technical skill level, and ability to concentrate and multitask in the online learning (Martín et al., 2021; Palfrey & Gasser, 2011). However, there is also research that states that some research results show that even some students still need some conditions to be carried out offline. And interestingly the students' perceptions of this virtual learning environment show different results regarding the culture and technological development of their country (Tóth et al., 2022). This study intends to reveal this in the background of developing countries in Indonesia.

Art & Design Studio-Based Learning

Studio-based learning focuses on learning through action and developing a creative process, design, performance, or product that individuals can assess. "Studio" is usually a dedicated classroom or performance space, but it can also be a social setting within a community. Generally, students are given practical assignments and projects that can be solved individually or collectively(Park, 2011). Students share their solutions and development process. The studio is a space for students and teachers to interact based on each other's traditional principles of supervision and consultation. This method has not significantly

changed from its historical roots in models such as the Ecole Des Beaux Arts and the Bauhaus in 18th century (Broadfoot & Bennett, 2003). It is considered similar to studio-based Learning pedagogy (SBL) is an educational method with a distinctive student-centered approach. In the 21st century, the studio space is still at the core of teaching and learning about art and design programs (Boling et al., 2016). Creative fields, which are mostly art and design, also trigger the growth of art and design education, especially at the university level. Colleges of art and design apply most of their methods using studio-based learning.

Educators typically use studio-based learning in architecture, design, engineering, and the creative and performing arts. Although they vary in form, studio-based learning has always focused on learning through action and developing creative processes and/or assessable designs, performances, or products. The evaluation of creativity is not simple, especially because of the diverse interpretations of creativity, but also because of the highly personal ways in which creativity is experienced and judged. Studio-based assessments are suitable when graduate outcomes include the ability to design and develop creative products. A studio is usually a dedicated classroom, design, or performance space (Agrawal, 2009).

Creative Process

Cognitive psychologists define creativity as a convergence of fundamental cognitive processes, core domain knowledge, and environmental, personal, and motivational factors in which an individual is seen as novel and fit for a specific purpose. The result makes it possible to produce an object or action (Saunders & Ward, 2009).To be creative means we have the flexibility of mind. Over the years it has been proven that those who are more creative than most people are usually free-spirited, less restrained, and in control, but love spontaneity and prefer to express their feelings and emotions (M. A. Runco, 1991; Starko, 2021).

The discussion about elements of the creative process was first introduced by (M. Runco, 2004). The elements involved are Person, Process, Product & pressure. But this research takes a more recent and detailed theory about the elements that influence the creative process, specifically in the fields of art, architecture, and design (Fakhra & Gregory, 2010). In Figure 1 the important elements in a creative process are the source of creativity, quality characteristics, strategies, influential factors, and individual or group working modes. This element was used as a variable in this research.

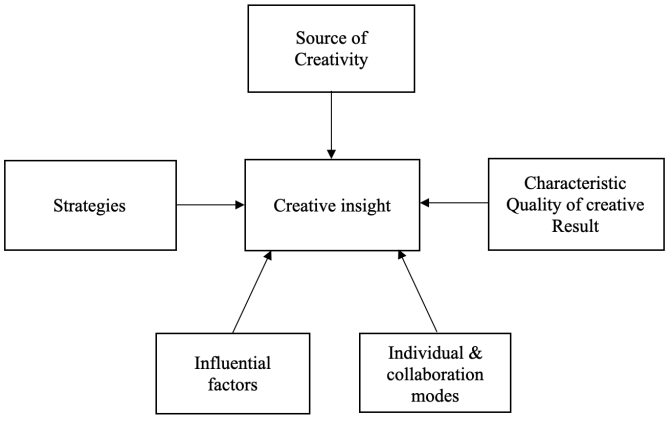


Figure 1: Diagram adaptation of creative process influence elements.
(Source: Fakhra & Gregory, 2010.)

In this study, the creative process is also seen from the most common stages proposed by physicist Herman von Helmholtz which was later refined by Graham Wallas. The stages of the creative process are Preparation, Incubation, Illumination, Verification, and then Evaluation and Elaboration. The preparation is a phase in which the problem is considered in all directions; the incubation is a phase that much unconscious mental exploration took place; the illumination is an emerging insight from the deeper layers of the mind and permeates consciousness, often in dramatic ways; the verification is a part that critical thinking and aesthetic judgment to refine the work and communicate its value to others; the evaluation is a phase that the ideas are critically questioned and weighed against other solutions. Either feedback, another research to test ideas, or compare to the original problem to work as a solution; the elaboration is the final stage of the creative process where the work takes place. This final stage of the creative process involves fine-tuning or perfecting an idea, bringing it to life, and sharing it (Sadler-Smith, 2015).

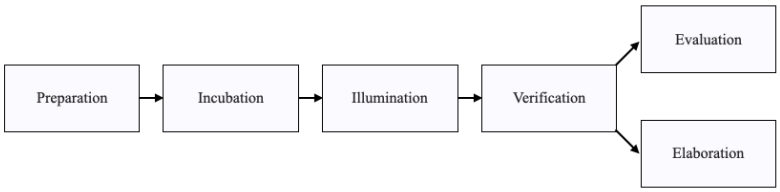


Figure 2: Adaptation of creative process stages by Graham Wallas.
(Source: Sadler-Smith, 2015.)

Method

Case Study & Surveys

This descriptive study uses a case study from the Faculty of Art and Design at a university in Bandung, Indonesia. The subject of research is students majoring in practical art and design program. Students typically work on projects in physical classes using a variety of assistive tools, both manual and digital. Because all learning activities take place online, a student's creative process relies heavily on on-screen instructions and communication via conference calls, learning applications, and group chat messaging. Specifically, this research focused on the process of student activities conducted online in one semester. For this study, research data was collected from 107 students from five different art and design programs. At the time this survey was conducted, the average age of students born in 2003 and 2004 was between 18 and 21, so the research topic was included in a Gen Z category. It consisted of 28 males and 79 females.

The initial research method was carried out by distributing a Likert survey which refers to variables related to the creative process elements and the stages, which are the source of creativity, quality characteristics, strategies, influential factors, and individual working modes. Then the online Likert scale questionnaire was distributed using the Microsoft Form application. From our findings, we processed the data by displaying the score results using Microsoft Excel so that the data could be analyzed as a simple graph. Once the descriptive data have been collected, the next step is to further explore the findings of the research analysis through a semi-structured interview process with five students (3 male, 2 male) representative of the research topic. From the results of the interviews, the researchers then conducted a literature study related to digital natives' characteristics and creative processes.

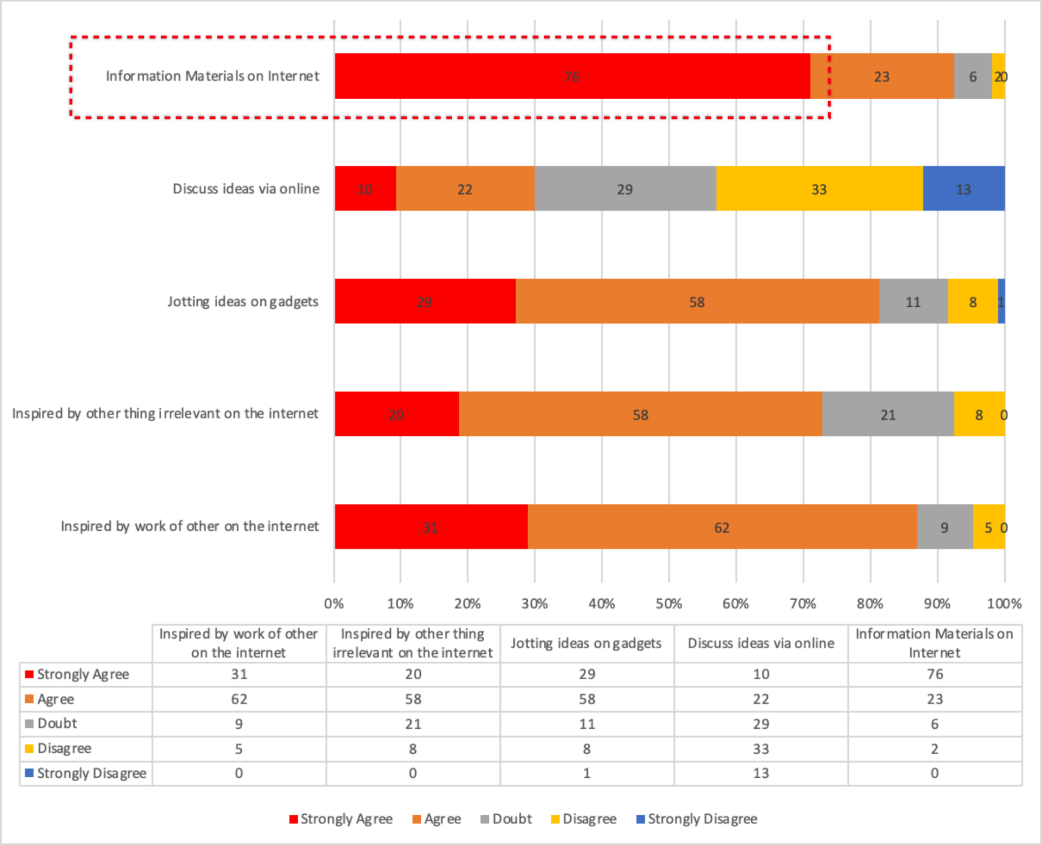
This research has several limitations. The first limitation is the number of samples. The participants who took part in the survey were not the total student body of students in the whole art and design department. Then the aspects that become variables in the study are only seen from the creative process elements and stages theory which the researchers selected from several previous research findings. So that the possibility of a more detailed variable aspect can be carried out for further research.

Discussion

The survey was conducted on 107 Art and Design students. From the survey, it is known that the respondents came from different study programs, namely Visual Communication Design as much as 52%, Interior Design 23%, Fashion Design 17%, Fine Arts 5%, and Architecture as much as 3%. Most of the respondents are aged 18 & 19 years and also most of them are women, which is as much as 74%.

Internet Source of Creativity

The first variable that was asked of the respondents is the source of creativity, in this survey, the respondents were asked for their agreement regarding their perceptions of the creative process in the studio and also regarding the inspiration they found in the process. In this variable, involvement in technology media use is also included. From the results, it is known that it is clear that the use of internet technology media plays a very important role in the process, they use the internet to get material resources to do the assignment. But from these results, it is also seen that discussing ideas through online media is the least popular choice among students (Fig.3). This happens very often in the online learning process in all fields. The "read-only" student is a student who participates in the learning process but tends to be passive (Nagel et al., 2009). This is because online learning media allows a person to become invisible. The lack of student roles in low-communication projects and activities naturally makes students reluctant to participate in discussions.



	Inspired by work of other on the internet	Inspired by other thing irrelevant on the internet	Jotting ideas on gadgets	Discuss ideas via online	Information Materials on Internet
Strongly Agree	31	20	29	10	76
Agree	62	58	58	22	23
Doubt	9	21	11	29	6
Disagree	5	8	8	33	2
Strongly Disagree	0	0	1	13	0

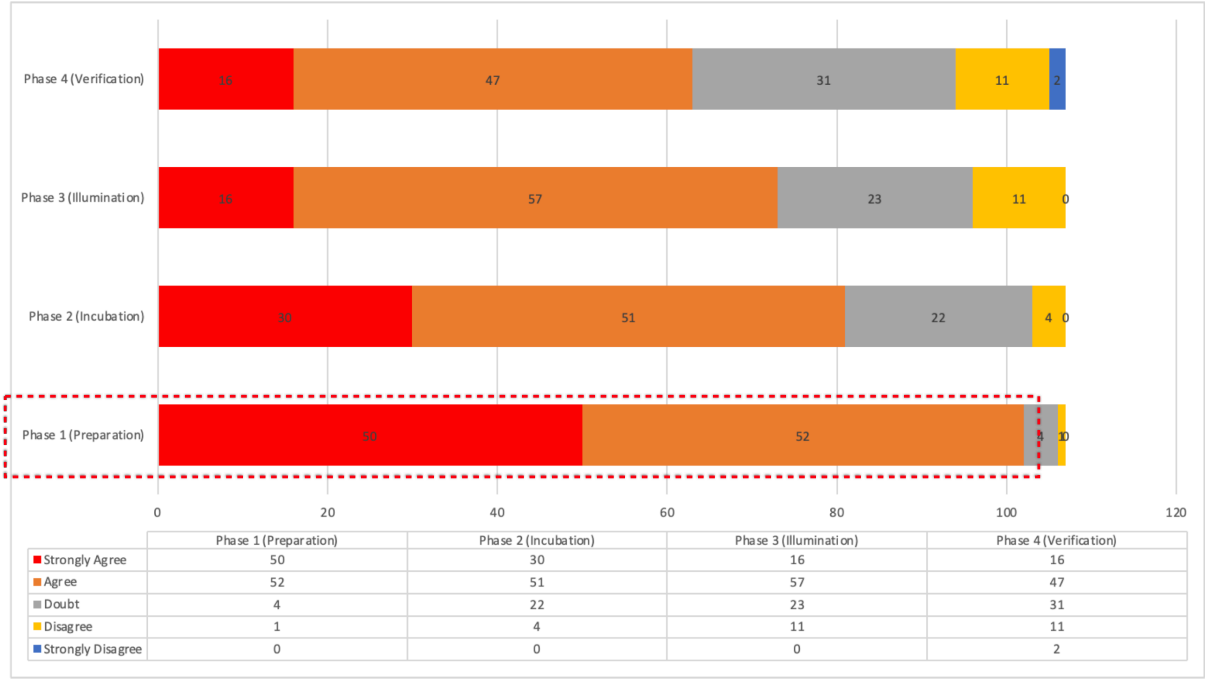
Figure 3: Survey results regarding sources in the process of student creativity.

From the results, it is also found that students prefer internet sources that categorize as visual reference types such as Pinterest or similar, not video or text media as much as 79 scores. Similar to websites for visual reference, Pinterest or similar websites are social media that are used to upload photos and provide photo or image searches to make them into digital pinboards. Websites like this have been very popular since 2010 and are now widely used in creative industries as well as education. Apart from the function of social media, platforms like this make it easier for students to find inspiration or related content. Pinterest in particular is unique in its visual discovery system, where users can look for inspiration using keywords or by detected objects (Zhai et al., 2017). It turns out that this makes it easier and faster for art and design students to find inspiration to do their assignments. Searching through platforms like this replaces the process of making mood boards that students usually do by searching for text sources, now it can be done as easily as entering keywords, concepts or similar objects with an AI search.

Stages of Creative Process

In the stages of the creative process, 4 important phases were specifically taken in this study, from these results it can be seen that the use of internet / technological media is concentrated in the first phase, namely the preparation phase (Fig.4). In this stage students usually collect material and references to work. This shows that technological interference at other stages such as incubation, illumination and verification is smaller. Students still rely on several processes that use their hands, traditional drawing tools, and processes that are carried out without an internet connection. This was related to the next survey about the strategy they do for the process. For the strategic aspect that students do when making works, they prefer their work to look more unique and different from the others. They answered with a score of 42 for

strongly agree and a score of 53 for agree, compared with their answer for experimenting, gaining insight or exploring & developing works. This means that they stop using the internet source of media for other stages so that their works will expected to be more unique in its own way.

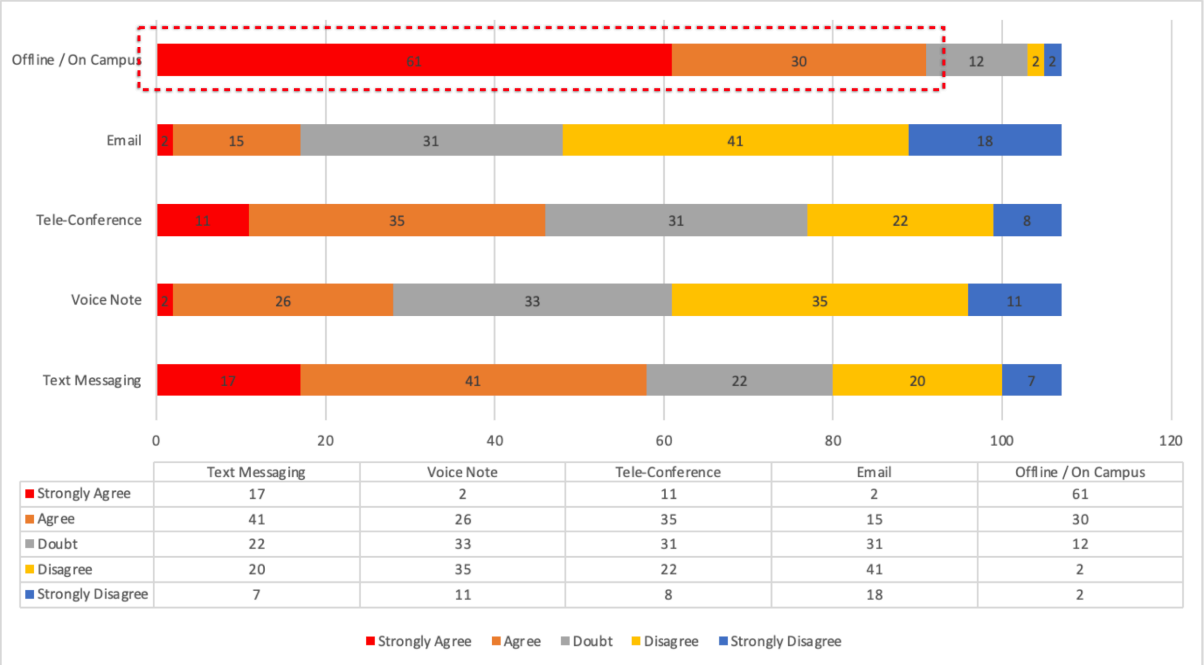


	Phase 1 (Preparation)	Phase 2 (Incubation)	Phase 3 (Illumination)	Phase 4 (Verification)
Strongly Agree	50	30	16	16
Agree	52	51	57	47
Doubt	4	22	23	31
Disagree	1	4	11	11
Strongly Disagree	0	0	0	2

Figure 4: Survey results regarding creative process stages.

Lines of Communication

Even though communication channels are getting easier and more accommodating, it turns out that many students prefer to meet directly with lecturers to supervise their assignments. In the working group modes**,** students also choose to communicate with their group mates directly or face to face (Fig.5). from the interview, the reason is that by meeting face to face they feel connected and fair for groups because all components of the group are working. By meeting face to-face physically and not on the screen, participation will be more pronounced. This was connected to the answer for the Modes of Working**,** if students are faced with a project or assignment, the first choice of modes is to do it alone rather than to work on it in a group. It can be seen that the characteristics of these students prefer individual work. they say that by working alone, they can easily anticipate things that will happen, related to documents or things in the process of work. It would be a waste of time if they have to make contact with group mates.



	Text Messaging	Voice Note	Tele-Conference	Email	Offline / On Campus
Strongly Agree	17	2	11	2	61
Agree	41	26	35	15	30
Doubt	22	33	31	31	12
Disagree	20	35	22	41	2
Strongly Disagree	7	11	8	18	2

Figure 5: Survey results regarding lines of communication.

Influential Factor

As it has been predicted that a fast internet connection becomes an influencing factor in the process of learning, but also becomes the aspect for them being more creative (Fig.6). In this survey, students were asked about motivation and what factors influence the creative process in carrying out assignments. There are two answers that stand out and get a high score, namely the internet connection and also the people in the surrounding environment. In the process of doing assignments, students feel that an internet connection is very important for the smooth running of assignments, including finding materials, working in document files that are connected to cloud storage, and also connecting with their friends via group messages. They admit, very often their lack of motivation cause due to technical problems in the network. In the interview they also said that the biggest difference when learning in an online environment is the loss of support from friends who motivate or trigger their inspiration in doing assignments. They prefer to do their own thing, but the isolation in their rooms while online doesn't help much either.

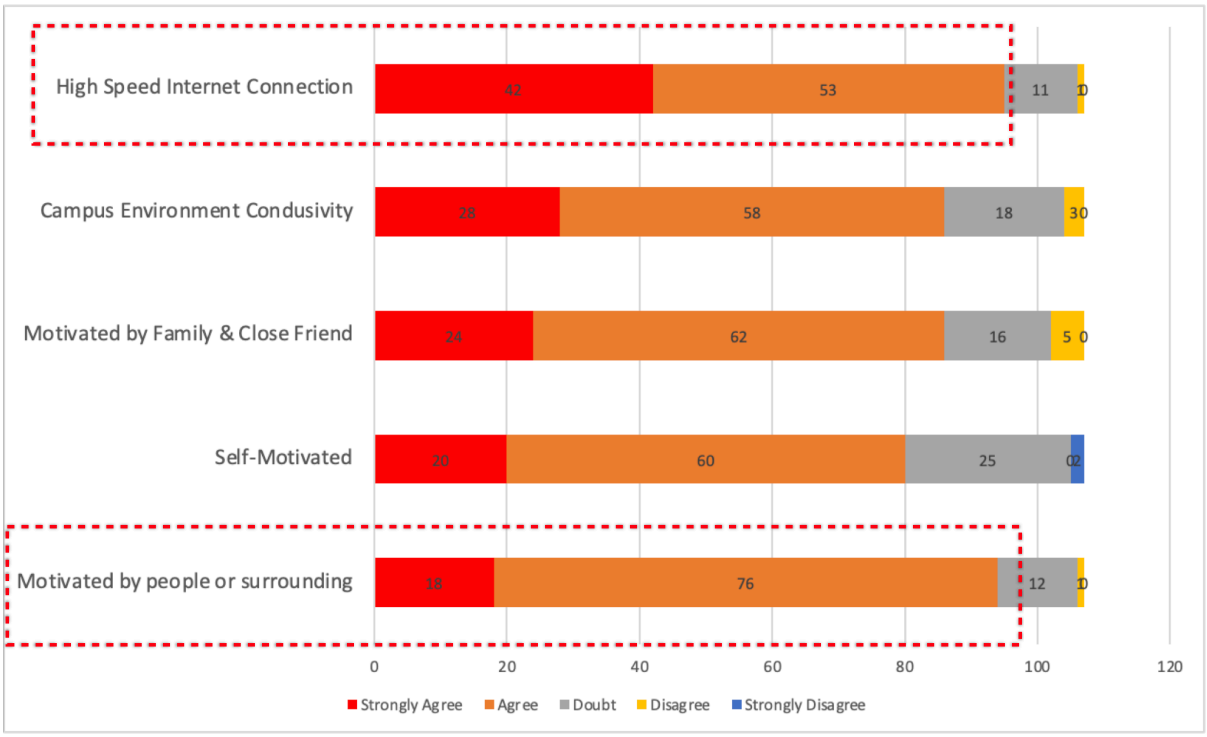


Figure 6: Survey results regarding influencial factor in working process & output.

Working Process & Output

From the survey results, students prefer to do their assignments digitally, even though manual steps in the form of hand-drawing sketches also need to be done. From the interviews, it seems that they have the perception that digital skills are more important because according to them nowadays the output of art and design is more digital. From the aspect of dependence on technology, this survey shows that working hours with computers are still considered balanced, namely 5 hours a day. Regarding multitasking, it turns out that they don't want and sometimes are unable to multitask in this learning process. Then, if you look at the number of tabs/windows that are open simultaneously, it's still at the middle level, namely 4 to 6 tabs/windows. Likewise with opening the application, it is still relatively small (Fig.7). After being confirmed through interviews, they explained that the number of open tabs or applications distracted them from their work assignments. Apart from that, the reason is that some of them cannot afford to have a computer capacity that can open many applications simultaneously. The result from process-reflectiveness surveys emerges as one of the qualities of creative results that mirrors the creative process through which it is conceived. From the results, it can be seen that the high score is in originality and effort. This means that in the process of working, students uphold the value of effort and the originality of their work.

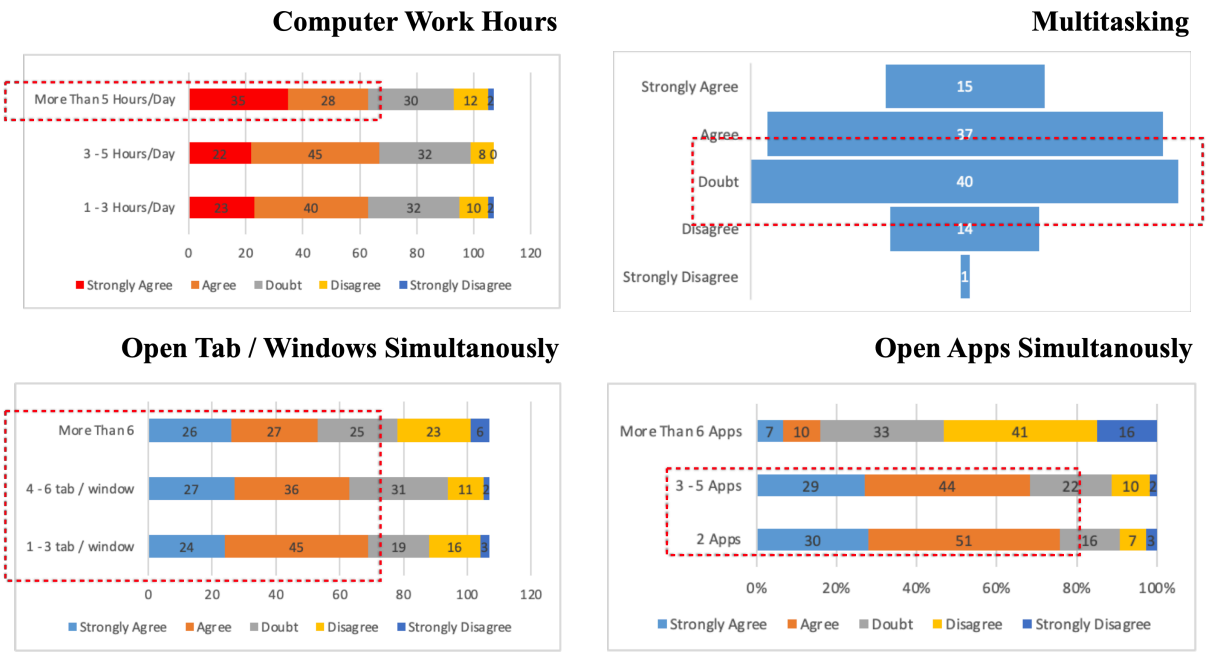


Figure 7: Survey results regarding technology dependency.

Findings

In the process of learning in this study, technological media is indeed used in every stage, but it is still done proportionally, especially for the early stages of developing work ideas. Students work with art, skills, techniques, and processes to develop their knowledge and use materials while exploring different forms, styles, and contexts. Students also learn to critically reflect on their own experiences and reactions to the other work they found in the internet to develop their artistic knowledge. They learn to express and communicate increasingly in a different experience. In this new learning environment, they discover new ways to present and express their observations, ideas, and imagination. Students develop an understanding of knowledge at every stage of the creative process including observing, discussing, and evaluating the characteristics of artworks. They are looking for a web-based application or tool that fits their purpose at each stage, here too they need to adapt to the tool.

With an online learning environment, they prefer to meet in person with lecturers for supervision and also discuss with group mates, this shows that the level of interpersonal engagement is still considered important in their work. Working individually is a picture of how they want control over what they do. Although they can do it in groups there are some things they choose to do it individually. The virtual studio space cannot be fully accommodated online, there is a loss of communication and engagement between lecturers and students and also between the students themselves and this greatly affects the results of the work. this is also related to a reflection practice, a term coined by Schön (1983) (Visser, 2010), is an important part of this type of design education because it is a dialogue between thought and action that helps students become more competent. Reflective practice is a working and learning method in continuous professional development that consists of "behavioral reflection" in which practitioners reconstruct their writing experience, consider its meaning, identify actions, and act.

Conclusion

With changes in the learning process mediated by technology, there will also be changes in the creative process of students working. Meaningful engagement theories that state students who are intellectually, socially, and behaviorally involved and engaged lead to improved learning (Kearsley & Shneiderman, 1998) in learning activities through interaction with others are still relevant in this virtual studio situation.

This situation leads to autonomous learning, defined as the ability of learners to direct their learning. Autonomous learning is a complex, multi-layered structure. It can be defined as the learner's ability to direct his or her learning, which means taking responsibility for decisions related to various aspects of the learning process (Derrick et al., 2005). But above all, autonomous learning implies critical thinking, planning and evaluation of learning, and reflection, a conscious effort on the part of the learner to continuously monitor the learning process from beginning to end.

In the field of art and design, there is a uniqueness in the learning process, especially in how to create ideas and artworks. The learning process will always change according to the generation, but the creative process must be reviewed in more in-depth research because it is related to how a higher education institution runs its curriculum. With the uniqueness of the current generation, it must also be reviewed how this becomes a cultural transformation. By considering the many things related to methods and changes in learning experience from generation to generation, research in the field of art and design also needs to look at the development of the field itself. Ideally learning methods can adapt to the times, but can also create new learning innovations for this field.

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