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Improving Students' Active Learning Through Demonstration Method

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ABSTRACT

Improving the quality of education begins with the techniques and learning media available. This study was done with 30 students from the High School of OKU Students of Class X A. The descriptive qualitative research method was utilized, and the study subject was the instructor who teaches in the classroom. In this study, data was gathered by observation, interviews, and documentation. The data were then analyzed qualitatively using Miles and Huberman's Theory. The method was applied according to the author's needs. The findings revealed that the teacher delivered the content using the demonstrative technique. Based on the student active learning questionnaire findings, it can be stated that the teaching and learning process went well, and students felt more comfortable participating in the learning for graphic design subjects utilizing the demonstration technique.

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1. INTRODUCTION

There are numerous competency abilities taught in schools, one of which is computer proficiency. (Puraet al., 2021). Teachers must select the appropriate teaching technique based on the subjects to be taught in order to stimulate student learning activities (Aprisal & Abadi, 2018). The majority of courses in primary schools, in particular, conduct a lot of practical activities; in this situation, instructors who teach in vocational schools, of course, pick teaching methods that include practical activities, such as the demonstration method (Winardi & Dwijanto, 2017) Whereas this approach is a style of learning that begins with a teacher's example, is then done directly, and pupils will follow what the instructor has illustrated (Journal et al., 2021). This method no longer has to prioritize absorption through information attainment, but rather focuses on developing students' abilities so that they can apply the knowledge they have acquired, thereby increasing the learning activity of students in class IV A in the teaching and learning process, particularly in the fundamentals of graphic design (Hayati, 2021).

According to the findings of preliminary observations conducted by researchers in class X A at High School in OKU on basic graphic design subjects, student involvement remains low (Sofiana, 2015). Students are less active during the learning process, both physically and non-physically, as seen when the learning process takes place, such as students being lazy to ask questions and to write what the

teacher has said in front of the class using the lecture method, and being busy telling stories with their classmates. When the teacher explains the subject matter, students do not dare to express their opinions in class, and they look sleepy (Hapsari et al., 2015; Susantiet al., 2019). This is something the author discovered when conducting interviews with students in class X A RPL. According to the findings of interviews with instructors on fundamental graphic design courses, the lack of student learning activity is caused by the employment of traditional learning techniques, which allow students to become bored while studying (Ghazali, 2020).

In relation to the foregoing, in order to engage students in the learning process, the teacher, as a member of the teaching staff, must master the appropriate teaching strategies for overcoming student challenges (Nurastuti & Yuana, 2021). The instructor tries to utilize the demonstration approach to encourage student involvement in learning during the learning process. This is supposed to be able to stimulate student learning activities so that the learning process becomes enjoyable and the desired competence levels are met (Journal et al., 2021). Learning is a method or process for educating students or students that is planned, devised, implemented, and assessed in order for students or students to attain learning objectives effectively and efficiently (Hanida, 2020).

Because learning is supposed to create learning, external conditions must be organized in such a manner that the internal processes included in each learning event are activated, supported, and maintained (Muzahid & Ar, 2019). The teacher-designed learning process aims to improve students' ability to create new knowledge as part of an attempt to boost mastery of good subject matter and learning resources in a learning environment. Learning is fundamentally a process of contact between teachers and students, either directly via face-to-face activities or indirectly through the use of various learning mediums (Muharika & Agus, 2019). Learning frequently includes students in a variety of challenges, requiring them to use higher-order thinking abilities in order to reach learning objectives. Learning based on skills that students must acquire, namely minds on, hands on, and hearts on, implying that kids can think, have skills, and have a noble conscience. Learning that demands and motivates pupils to be active and imaginative in their search for concepts (Ugiarto, Cahyono, & R, 2017).

The demonstration method is a teaching method that uses demonstrations to clarify an understanding or to show students how to do something or the teacher's method of teaching by demonstrating and showing students a process, situation, event, sequence of doing an activity, or certain objects that are being studied either in actual or imitation form through the use of various types of media that are relevant to the subject matter to make it easier for students to learn (Deandels, 2018) (Stern, 2019). The demonstration approach focuses the pupils' attention on what is being displayed (Alba, 2014). As a result, the student process will be more focused and students' attention will be diverted to other problems; it can stimulate students to be more active in participating in the learning process; it can increase student experience; it can help students remember the material presented for longer; and it can reduce misunderstandings because teaching is better. clearly and concretely, can address all of the difficulties that emerge in each student's thinking because they engage directly, stimulate development and bravery, take initiative, be responsible and autonomous, so that learning results are consistent with what is intended.

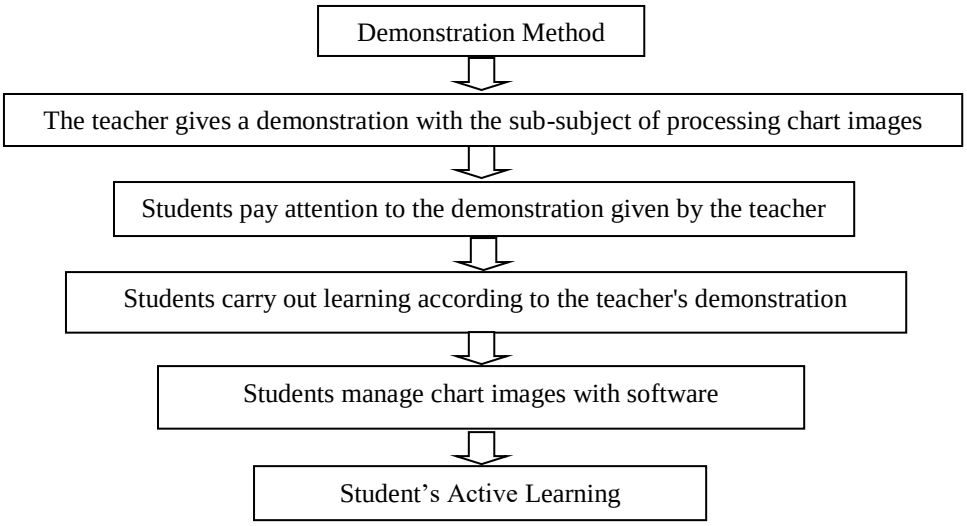

Figure 1. Demonstration Method Mindset Chart

2. METHODS

This study employs the descriptive approach to provide an overview of the existing condition (Deandels, 2018). The descriptive technique may be defined as a problem-solving approach that investigates the current status of the subject/object of study (a person, institution, society, and others) based on the facts that exist or as they are presented (Heinrich, 2016). Descriptive qualitative research aims to describe what is seen, heard, felt, and questioned. Descriptive research focuses on actual issues that arise throughout the study process. Researchers use descriptive research to describe and explain occurrences and events that are the focus of attention without providing these real events special consideration. Qualitative research seeks to comprehend the phenomena of what research participants experience, such as behavior, perception, motivation, action, and so on, horizontally and via description in the form of words and language, in a natural setting, and by employing diverse natural methodologies. In this paper we used observation, interviews, and documentation. The data were then analyzed qualitatively using Miles and Huberman's Theory. The method was applied according to the author's need.

Based on the information provided by the experts, it is possible to infer that descriptive qualitative research is a set of actions designed to acquire data that is as it is without being subjected to certain conditions, the findings of which stress significance. Because this study investigates the phenomena of student active learning through the use of the demonstration technique to students of Class X A Software Engineering in Graphic Design courses at High School in OKU, the researcher employs a qualitative descriptive research approach.

The data gathering technique is the most crucial phase in research since the researcher's main purpose is to get data; if the researcher does not know the data collection techniques, the researcher will not receive data that fits the data standards specified. In this study, four data gathering strategies were used, namely: Observation, observations made by researchers to teachers and students of class X A Software Engineering in basic graphic design subjects at SMA Negeri 01 OKU, with the goal of obtaining information about the application of the demonstration method to student active learning in basic graphic design learning.

3. FINDINGS AND DISCUSSION

The results obtained from the research have to be supported by sufficient data. The research results and the discovery must be the answers, or the research hypothesis stated previously in the introduction part.

The demonstration approach was employed to collect data from active class X students at High Xhool in OKU during this investigation. These pupils' activities include reading, listening, writing, and other abilities. Before taking action, the researcher conducted pre-class research activities, which began with monitoring the instructor's teaching process, in which the teacher employed traditional approaches (lectures). According to results, even instructors still employ the lecture technique in teaching and learning activities. Students are often passive during the learning process. Pupils who are active will still ask the teacher if they do not understand, but passive students will remain mute and do not ask questions, resulting in improper channeling of comprehension of the content. Students are merely obliged to listen to the teacher's explanation and comprehend in order to learn, but they are not required to receive the content effectively, resulting in students' final grades that are not excellent or below the standard minimum criteria (KKM).

Student learning activity remains low. According to the findings of observations and interviews, barely 20% of students engage in active learning. Researchers discovered numerous characteristics associated to low student learning activity during their learning process on teachers. Students are disinterested in studying and become bored while listening to the information. Because students just hear explanations, they are too indolent to address issues in the content. Researchers know which subjects are regarded difficult by pupils and make them lethargic to follow the instruction based on the findings of interviews with students. Students who adhere to traditional learning methods may experience pain during continuing education activities.

In this study, this circumstance indicates that student learning activity is poor. The information that the researcher will utilize as a starting point before taking remedial action with the demonstration technique. Based on the preliminary findings, it is required to enhance the learning process so that students engaged in learning may generate communication between students and teachers and boost student engagement in final product outcomes. This may be accomplished by modifying the learning techniques used by teachers, namely by employing the demonstration approach in learning the fundamentals of graphic design during the learning process.

Based on observations made by researchers during the learning process in teaching and learning activities, it was discovered that the lowest activity prior to the application of the demonstration method in learning activities was asking questions and activities that students frequently do, namely listening. Almost all student active learning increased prior to the research and at the first meeting, including paying attention, taking notes, asking questions, answering questions, and completing assignments, because some students were unmotivated to follow the lessons and the teacher's explanations in front of the class. This occurs because pupils have a proclivity to experiment with the content that has been demonstrated.

The second meeting saw an upsurge in student involvement. Every student action that happened throughout the learning process increased significantly from the first meeting to the second meeting. Almost all of the activities were included in the very good criterion at the second meeting. Students will use visual and audiotorial learning to see and hear explanations correctly and realistically because they can see directly the process of making images in graphic design on demonstration objects by applying the demonstration method through taking image appearances and the process of making image effects not just read. As a result, during the demonstration activities, pupils are given the opportunity to immediately attempt or practice what the teacher has done. One downside of the demonstration approach is that pupils in the rear seat cannot clearly view the presentation. As a result, there may be misconceptions in the demonstration, disrupting the learning route.

3.1. Application of the Demonstration Method to SMA Negeri 01 OKU Class X Students

The demonstration technique is used in line with the Lesson Plan (RPP), and learning activities are carried out using the demonstration learning method. In front of the class, the teacher performs demonstrations of graphic design material with pupils in line with the lesson plan. Observers help the researchers. Using student active learning observation sheets, the observer assists in observing student learning activities. Thirty pupils participated in the learning activities. The instructor began the class by praying, attending, and communicating the learning objectives connected to the teaching content to be provided. The teacher prepares the materials that will be utilized in learning, and the instructor communicates with pupils to inspire them to participate in the learning process. Following that, the instructor explains the issue that will be displayed about the image, and then instructs pupils to follow the processes for creating the image design that the teacher shows. Students who wish to ask questions and do not comprehend the content are asked by the teacher.

The actions of teaching and learning For the following 20 minutes, each student completes a practical exercise on a computer by creating picture designs using demonstration material instructions that are currently accessible. During the teaching and learning process, the instructor re-explains and accommodates numerous queries posed by pupils in order to achieve interaction and learning objectives. The instructor then summarizes the learning outcomes that have been presented. In the final exercise, the teacher presented an outline of the subject for the next meeting and concluded with a prayer.

3.2. Student Active learning Using the Demonstration Method with Class X Students

3.2.1. Results of Teacher Activity Observation

The analysis of the teacher activity observation sheet performed by four observers yields the data shown in table 1. This teacher activity sheet describes the technique used by the instructor during learning activities utilizing the demonstration approach, which is as follows:

Table 1. Observation Result Teacher's Active Teaching

Observer	Meeting I	Meeting II
1	36	39
2	35	39
3	35	38
4	34	39
Amount	140	155
Average Score	35	38,75
Prercentage	87,58 %	96,87%
Active Category	Very Good	Very Good

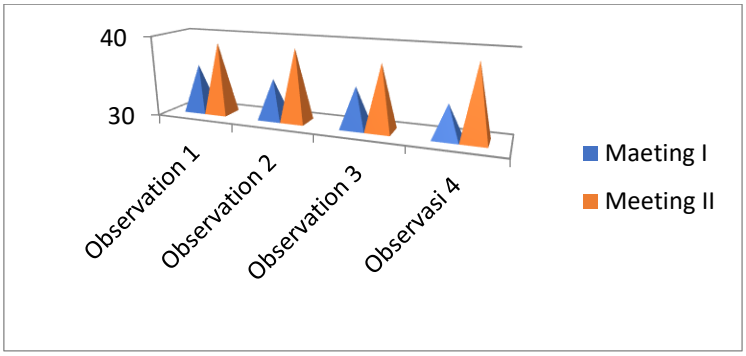

Figure 2. Teacher Activity Observation Results

According to the table above, the average score in the learning process witnessed by two observers was 35 with a presentation of 87.58 percent in the very excellent category at the first meeting, and 38.75 with a presentation of 96.87 percent in the very good category at the second meeting. As a result, the execution of the learning process in the first and second meetings was excellent. However, two components of the evaluation are still labeled as good on the observation sheet, and they are as follows:

a. The teacher describes the learning objectives that pupils must attain. The instructor has written down the learning objectives that students must attain but has not described them in depth during the learning process. The teacher swiftly describes the procedures of the demonstration; and
b. The teacher directs and guides pupils while they do demonstrations. During demonstrations, the teacher just provides pupils help at a glance in front of the class and does not inquire about individual student's challenges.

Efforts were made to improve components that were still deemed satisfactory during the first and second meetings, such as the analysis of teacher and student observation data. To enhance characteristics that still receive high points on the teacher's observation report, you must:

a. The teacher describes the learning objectives that pupils must meet. The instructor lays out the learning goals that students must complete but does not discuss them in depth until the evaluation criteria are sufficient. For further learning, the instructor should create and describe the learning objectives that students must attain in detail, as well as explain the demonstration stages slowly so that students comprehend and understand better; and
b. The teacher directs and guides pupils while they do demonstrations. The instructor should offer direction and advice to all students and conduct demonstrations equitably, as well as visit each student's desk in turn and inquire about their difficulties in showing.

Based on the data gathered during the second meeting, it is clear that the teacher's activeness has been effective as compared to the two previous meetings. It is capable of doing a demonstration. During demonstrations, the teacher just gives pupils help at a glance in front of the class and does not inquire about the issues of each group.

The overall percentage of the attainment of an activity score of up to 96.87 percent demonstrates that efforts were made to overcome elements that were still regarded good at meeting 1 and meeting II. Data study of instructor involvement in graphic design learning revealed an increase between meetings I and II. Following the second meeting, corrective action procedures will have a good influence on enhancing teacher activity.

3.2.2. Results of Observation for Student Active Learning

Analysis of student active learning data in the student active learning sheet carried out by four observers, which is a description of the activity carried out by students during the learning process using the demonstration technique at the first meeting and second meeting witnessed by two observers. The findings are shown in the table below:

Table 2. Observation Results of Students' Active Learning

No	Question Indicator	Meeting Percentage		Average
		I	II	
1	Before the session begins, I prepare all of the lesson's requirements.	81.67	85.83	83.75
2	I inquired about the introductory content to be demonstrated with the teacher.	58.33	76.67	67.5
3	I pay close attention to the steps of the demonstration.	70	78.33	74.16
4	I appreciate studying the fundamentals of graphic design.	62.5	79.17	70.83

5	When the teacher discusses the learning material, I take notes on what I think is significant.	64.17	80	72.08
6	I re-enact the teacher's demonstration.	72.5	80	76.25
7	I read the manual provided by the teacher.	52.5	81.67	67.08
8	I summarize the content myself to make the learning material easier to grasp.	58.33	78.33	68.33
9	When my friends are studying hard, I go to study.	54.17	81.67	67.92
10	I complete the assignment assigned to me by the teacher.	75	80	77.5
11	When completing practical learning, I pay close attention to the teacher's instructions.	70	78.33	74.16
12	When I don't understand something, I question the teacher.	58.33	80	69.16
13	When it comes to answering questions from the teacher during the learning process, I am confident.	57.5	82.5	70
14	I assist a buddy who is having difficulty with his schoolwork.	61.67	79.17	70.42
15	I am pleased with the teacher's tasks.	61.67	78.33	70
	Number of students attending	30	30	
	Average	63.89	80	71.94
	Criteria	Good	Very Good	Good

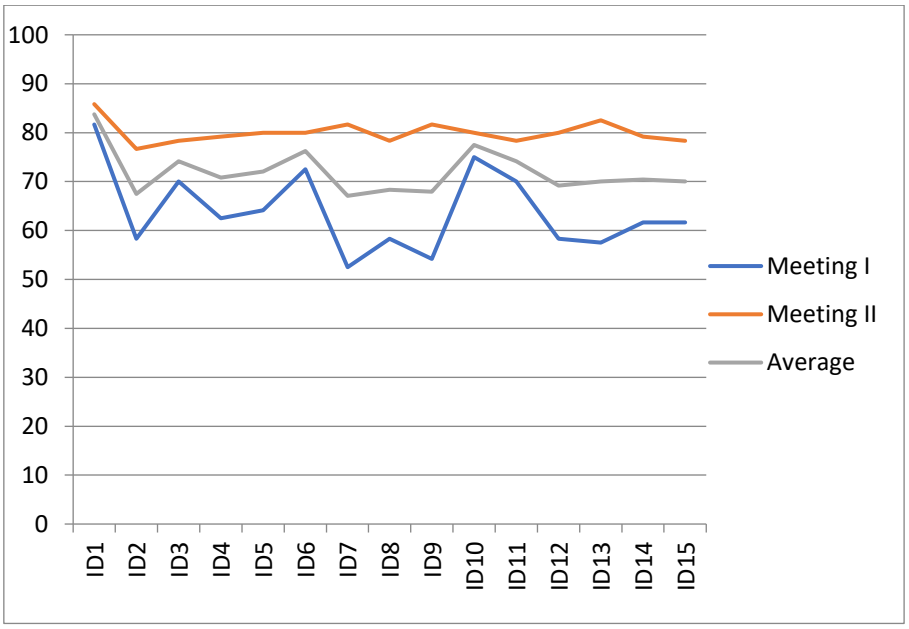

Figure 3. Observation Results of Students' Active Learning

3.3. Demonstration Method Application to Class X Students

Based on the findings of the study, the use of the demonstration method in teaching and learning activities (KBM) produced positive outcomes in the preliminary aspect, since the instructor followed

the stages of the demonstration method. This demonstration approach is effective because it adheres to the following concepts:

a. The teacher clearly and thoroughly demonstrates each phase of the demonstration in front of the pupils;
b. All spoken explanations may be heard clearly by all pupils;
c. Students learn what they must accomplish while producing a product;
d. The demonstration is meticulously planned by the teacher;
e. Demonstrations are held at the appropriate times;
f. Before the demonstration begins, the teacher prepares the equipment; and
g. A summary of the demonstration is displayed on the board.

Conditions and events that occur throughout the teaching and learning process can be viewed as follows when the demonstrative technique is used. The instructor may directly identify pupils who are not yet proficient in picture design, and then the teacher delivers instructions on the image format to be developed.

a. The content offered is simply accepted by students;
b. Students may instantly put what they have learned into practice;
c. Students have a better understanding of graphic design materials;
d. With reciprocity between professors and students, the environment in the classroom becomes lively; and
e. Students enjoy utilizing this demonstrative technique to learn.

Based on the study's findings, it is possible to infer that the demonstration technique has the following advantages:

a. The demonstrative technique captures and maintains students' attention;
b. Demonstrations present the material in an understandable manner;
c. Demonstration of persuasive questions regarding whether or not it is possible;
d. The manner of demonstration is both object and actual;
e. Direct absorption of the sources is accelerated by demonstrations; and
f. The example approach demonstrates the suggested procedure.

The use of the demonstration method reveals (a) students' high curiosity for what is unknown, (b) students' enthusiasm for doing the tasks assigned by the teacher and attempting to complete the tasks on time, (c) students' ability to apply the material learned in everyday life, and (d) students' overall happiness during the lesson. The teacher understands the situation and conditions of the classroom; a teacher should be able to feel, assess, and correct his success in managing his own classroom so that it is in accordance with the goals and expectations to achieve satisfaction and students can feel the pleasure and comfort as expected. Based on these findings, the instructor was successful in reflecting on the learning at the first meeting. At the second meeting, it is clear that the teacher's learning management has improved by the addition of learning equipment such as an LCD as a demonstration assistance.

This demonstrates that the instructor was not fully engaged in providing demonstrations in class and was unable to carry out the process of teaching and learning in the classroom, which is at the heart of educational activities at school, during the first meeting. Thus, teaching implementation is the interaction of teachers with students in order to communicate learning materials to students and achieve learning objectives. The demonstration method used was able to get students excited and better able to get students to understand and master the material and practice as well as increase the level of learning effectiveness, which means that learning activities utilizing the demonstration method were able to optimize students' understanding and mastery of the material and practice. The rise happened when the instructor was successful in reflecting on the learning at the second meeting using the LCD tool, so that they had a much better understanding of the situation and condition of the class. As a result, the instructor may effectively supervise learning through example. The more successful the attainment of learning objectives, the better the approach employed.

3.4. Student Active Learning Using the Demonstration Method with Class X Students

The students' activities is observed using a direct observation questionnaire. According to the questionnaire answers, activity is the capacity to perform practical actions correctly and methodically based on the principles of the demonstration technique in order to obtain the correct product. According to observations of students who are very active, it is simpler and better to assimilate existing information, grasp difficulties according to the learning material, and practice generating graphic design goods. The demonstration method can affect students' interaction patterns in the classroom when reviewing the material covered in a lesson and checking their understanding of the content of the lesson, so that student learning activity increases because the teacher gives direction to each student to better understand the material he is learning, where students are more enthusiastic in receiving lessons. According to the study of student observations, the following student active learning makes it simpler for good students to learn the subject matter:

a. Students take the initiative in learning by producing learning materials prior to the start of the learning process;
b. Students participate in demonstration activities and product production procedures by following the methods provided by the teacher;
c. Students are comfortable asking questions and expressing their ideas during the learning process;
d. Students like following and taking notes on topics that they believe are significant;
e. When the instructor asks a question, the pupils point to ask, and the teacher points to the student who answers the question;
f. Students rehearse the teacher's demonstrated explanation; and
g. Students are given assignments and are expected to do them correctly based on the teacher's explanation.

According to the data from the student learning activity score, the indicator of student active learning employs the demonstration technique employed by the instructor when most students undertake learning activities, including producing stationery and learning preparation. The effect of the demonstration method on learning activity where students are seen to be more active in the learning process, during the learning process student active learning is more directed at paying attention to learning steps, explanations during demonstrations, student curiosity, can both be categorized as high creativity.

According to the findings of the questionnaire at the first meeting, there was 1 indication of student engagement in presentations (76 percent-100 percent) in the very excellent category, namely signs of preparing learning needs, and there were 14 indicators of student involvement in presentations (51 percent-100 percent) in the good group, namely on the indications of asking, paying attention, engaging in learning, taking notes, practicing, reading manuals, summarizing the content, accomplishing assignments, being confident, assisting others, and completing given tasks. While there was an increase from 30 students at the second meeting, all measures of student involvement in presentations were same (76 percent -100 percent). According to the statistics, the average acquisition of student active learning at the first meeting with all indicators is in the excellent category with a presentation gain of 63.89 percent and in the very good category with a presentation gain of 80 percent. It may be determined from the average of the first and second meetings that student participation is in the good category with a presentation of 71.94 percent.

The data is the result of watching student learning activities as a whole throughout the first and second meetings; this is due to the presence of additional equipment during the demonstration utilizing the LCD to make it simpler to explain a series of demos on graphic design material. The demonstration method can increase student active learning and learning outcomes because it helps students present objects or visuals that can increase the attractiveness of students to the material to be studied, resulting in increased student active learning and motivation. Thus, learning with demonstration methods and

involving students in its implementation makes it easier for students to understand the subject matter, resulting in increased learning outcomes.

The findings from the student observation questionnaire in the very good category show that students are more interested and motivated at the second meeting. Students are more prepared to ask inquiries and communicate their thoughts. As a result, students are more engaged in expressing their thoughts and daring to ask questions during the learning process. Based on the findings of the research, it is possible to conclude that learning techniques that emphasize practice and movement, such as demonstration methods, can boost student learning activity in graphic design disciplines.

Many previous study supported this paper, first (Manan, 2011) states that the ability of academic knowledge of the Family Sociology course increases and is marked by students being active in the teaching and learning process using the active learning model during the learning process, this increase is marked by the emergence of interest and motivation of students approximately 82.58% who stated quite interested to very interested and motivated. Second (Effendi, 2016) found that integration of active learning and internet-based learning at the PGMI STAIN Ponorogo Study Program in the form of using learning strategies that develop students' analytical thinking skills, namely information search and role play in IPS1 courses, Jigsaw and eye demonstration Teaching and Learning Strategy courses, concept mapping and peer teaching in Science Learning courses at MI. The need to examine learning techniques based on the active learning model, offering clear instructions, strong student motivation, and the availability of learning facilities and infrastructure are all factors that enable the integration of active learning and internet-based learning. While time restrictions, the dominance of clever students, and students' unpreparedness to assimilate new content are all impediments to the integration of active learning and internet-based learning.

Then according to (Hatta, Aristyagama, Yuana, & Yulisetiani, 2020) the need to examine learning techniques based on the active learning model, offering clear instructions, strong student motivation, and the availability of learning facilities and infrastructure are all factors that enable the integration of active learning and internet-based learning. While time restrictions, the dominance of clever students, and students' unpreparedness to assimilate new content are all impediments to the integration of active learning and internet-based learning. However (Kariadi & Suprapto, 2018) state that while using active learning, the learning process is not simply concentrated on the instructor; students must also be actively participating in the learning process for learning to be more meaningful.

4. CONCLUSION

The teacher delivered the materials using demonstrative technique and the teaching and learning process went well. Then students felt more comfortable participating in the learning for graphic design subjects utilizing the demonstration technique. Student active learning will be more very good if the teacher uses demonstration as learning strategy. This paper only talks about active learning, for the next researcher we hope they will more deeply investigate the active learning which collaborate with the blended learning and hybrid learning.

REFERENCES

Alba, F. M. (2014). Keefektifan Model Pembelajaran Generatif Dan Missouri Mathematics Project Terhadap Kemampuan Pemecahan Masalah. *Unnes Journal of Mathematics Education*, *3*(2). https://doi.org/10.15294/UJME.V3I2.4473

Aprisal, A., & Abadi, A. M. (2018). Improving students' mathematical reasoning and self-efficacy through Missouri mathematics project and problem-solving. *Beta: Jurnal Tadris Matematika*, *11*(2), 191–208. https://doi.org/10.20414/BETAJTM.V11I2.206

Deandels. (2018). Introducing educational design research | Jan Van Den Akker, Koeno Gra.

Effendi, M. (2016). Integrasi Pembelajaran Active Learning dan Internet-Based Learning dalam Meningkatkan Keaktifan dan Kreativitas Belajar. *Nadwa: Jurnal Pendidikan Islam*, *7*(2), 283–309.

https://doi.org/10.21580/nw.2013.7.2.563

Ghazali, A. Al. (2020). Pelatihan Dasar Microsoft Office Dan Pengenalan Teknologi Komputer Era Industrial 4.0 Kepada Siswa SMA Madinatul Quran Depok.

Hatta, P., Aristyagama, Y. H., Yuana, R. A., & Yulisetiani, S. (2020). Active Learning Strategies in Synchronous Online Learning for Elementary School Students. *IJIE (Indonesian Journal of Informatics Education)*, *4*(2), 86. https://doi.org/10.20961/ijie.v4i2.46019

Hayati, R. R. (2021). *Aplikasi Jurnal Penelitian Ilmu Dan Teknologi Komputer Berbasis Web Di Jurusan Teknik Komputer*.

Heinrich, J. (2016). Educational Design Research. *Educational Design Research*. https://doi.org/10.4324/9780203088364

Huda, J. (2020). Pelatihan Keterampilan Dasar Komputer Dan Teknologi Informasi Bagi Perangkat Desa Di Kecamatan Air Besi, Kabupaten Bengkulu Utara.

Journal, C. D., Dermawan, A., Saputra, E., & Hutagalung, J. E. (2021). *Peran masyarakat dalam menaati hukum dan mendukung perkembangan teknologi komputer dalam bisnis digital*. *2*(3), 569–573.

Kariadi, D., & Suprapto, W. (2018). Model Pembelajaran Active Learning Dengan Strategi Pengajuan Pertanyaan untuk Meningkatkan Kualitas Proses Pembelajaran PKn. *Educatio*, *13*(1), 11. https://doi.org/10.29408/edc.v12i1.838

Manan, A. L. (2011). Penerapan Model Pembelajaran Active Learning Untuk Meningkatkan Motivasi Dan Prestasi Akademik Mahasiswa Pada Mata Kuliah Sosiologi Keluarga. *Agastya: Jurnal Sejarah Dan Pembelajarannya*, *1*(2), 248–261. https://doi.org/10.25273/ajsp.v1i2.712

Muharika, D., & Agus, F. R. (2019). Jurnal Pendidikan Teknologi Informasi. *Jurnal Pendidikan Teknologi Informasi*, *6*(1), 80–86.

Muzahid, M., & Ar, M. Y. (2019). *Peningkatan Teknologi Berbasis Komputer bagi Remaja dan Pemuda Warga Gampong Jambo Timu Kecamatan Blang Mangat Kota Lhokseumawe*. *3*(1).

Nurastuti, W., & Yuana, K. A. (2021). Simulasi Droplet Untuk Pendinginan Alat Teknologi Informasi Dengan Metode Lattice-Boltzmann. *Jurnal Informatika Teknologi Dan Sains*, *3*(3), 389–393. https://doi.org/10.51401/JINTEKS.V3I3.1039

Pura, M. H., Nuryadi, D., Universitas, C., & Karawang, S. (2021). Pembuktian Teknologi Informasi Dan Komunikasi (TIK) Dalam Tahap Penyidikan Melalui Bukti Petunjuk Melalui Ilmu Komputer Digital Forensik di Kepolisian Resort Karawang. *Jurnal Pengabdian Hukum Indonesia (Indonesian Journal of Legal Community Engagement) JPHI*, *3*(2), 193–205. https://doi.org/10.15294/JPHI.V3I2.42954

Sofiana, Y. N. (2015). *Efektifitas Model Pembelajaran Missouri Mathematics Project (MMP) dan Kooperatif STAD pada Materi Pokok Transformasi Ditinjau dari Minat Belajar Siswa Kelas VII Semester Genap SMP Negeri 2 Miri Sragen Tahun Pelajaran 2013/2014*. https://doi.org/10.5/JS/JQUERY.DATATABLES.MIN.JS

Stern, W. (2019). Educational research: Quantitative and qualitative approaches. - PsycNET.

Susanti, M. ., Fauziah, . ., & Wahyuni, Y. . (2019). Application of Missouri Mathematics Project (MMP) Learning Model on Mathematics Learning of Class VIII Students of SMP Negeri 15 Padang. *Jurnal Fakultas Keguruan Dan Ilmu Pendidikan*, *1*(4).

Ugiarto, M., Cahyono, B., & R, R. H. (2017). Media Pembelajaran Mata Kuliah Komputer Animasi Berbasis Android Di Fakultas Ilmu Komputer Dan Teknologi Informasi Universitas Mulawarman Samarinda. *Prosiding SAKTI (Seminar Ilmu Komputer Dan Teknologi Informasi)*, *2*(1), 315–320.

Winardi, W., & Dwijanto, D. (2017). Analisis Kemampuan Literasi Matematika melalui Model Missouri Mathematics Project dengan Pendekatan Open-Ended. *Unnes Journal of Mathematics Education Research*, *6*(2), 175–183.