PROCEEDINGS

International Conference
Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (APTEKINDO) 2018

Theme:

"Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0"

Surabaya, 11-14 July 2018

Speakers:

Prof. Dr. Muhadjir Effendy, MAP.
Minister of Education and Culture, Republic of Indonesia

Michael Freiherr von Ungern – Sternberg
Extraordinary and Plenipotentiary Ambassador of the Federal Republic of Germany to Indonesia, ASEAN and Timor-Leste (Jerman)

Prof. Dr. Wenny Rahayu
Head of School of Engineering and Mathematical Sciences
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Prof. Dr. Muchlas Samani, M.Pd.
Rector of Universitas Negeri Surabaya period 2010-2014 (Indonesia)

Faculty of Engineering
Universitas Negeri Surabaya
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"Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0"

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PREFACE

All praises be to Allah SWT, so that the 2018 International Conference of ***Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia*** **(APTEKINDO)** could be held in Surabaya during 11-14 July 2018. APTEKINDO International Conference isconducted biennially in which this year host is Faculty of Engineering, State University of Surabaya. Therewere sixteen colleges attending this year Conference, most of which were former Institutes of Teacher's Education (LPTK).

This year theme is *"Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0***"** aimed to respond to the development and acceleration of the industrial revolution 4.0 that has become the most discussed issues inmany countries. Industrial revolution connects machines with internet systems. In regard to facing such phenomena, Indonesian government through the Ministry of Industry has launched "Making Indonesia 4.0", of whichthe program focuses on industries that are driving the development of the industrial revolution 4.0 such as food and beverages, electronics, automotive, textiles and chemicals. To achieve better results of the program actualization, vocational education helps to prepare compatible and competitive workers for the areas of the aforementioned industries. Henceforth, numbers of Conferences, conventions, and meetings amongIndonesian practitioners in FPTK / FT-JPTK need to be held to initiate ideas in strengthening the role of LPTK within industrial revolution 4.0 era.

The Conference's proceedings contain 121 research papers and ideas that are relevant to the following nine sub-themes: *Technical and Vocational Teacher Competencies, Technical and Vocational Education Curricula, Technical and Vocational Education Models, Technical and Vocational Education Evaluation, Technical and Vocational Education Policy, Public-private Partnership in Technical and Vocational Education, Technical and Vocational Education Management, Technopreneurship*, and *Competencies Certification.*

Finally, all the committees send their gratitude to the participating speakers and all parties who support the run of the Conference. They also apologize for any inconvenience and wish a better undertaking event next year.

WELCOMING SPEECH RECTOR UNESA

Conference and Convention

Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia (Aptekindo) 2018

Rich Palace Hotel Surabaya, 11-14 Juli 2018

Assalammu'alaikum Warahmatullahi Wabarakatuh.

Respectable Head of Universities, members of APTEKINDO
Distinguished Keynote speakers
Honorable authors, and fellow participants of APTEKINDO Conference and Convention 2018

Alhamdullilah, first of all, let us express our gratitude to Allah SWT because of his grace and blessings, we are able to attend this international Conference and convention of the Indonesia Association of Technology and Vocational Education or ***Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia*(APTEKINDO)** held in Surabaya, 11-14 July 2018.

This international and national Conference is conducted biennially as a routine agenda held by Association of Technology and Vocational Educationor *Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia* (APTEKINDO), which consists of 16 different universities throughout Indonesia. We would like to thank for the opportunity given to Universitas Negeri Surabaya for hosting this year event.

In the raise of industrial revolution, Conferences, gatherings, and sharing of knowledge play an important meaning in supporting the acceleration of innovative science and technology. Therefore, this Conference's theme is ***"Revitalization ofTechnical and Vocational Education to Face Industrial Revolution 4.0".*** This is an interesting and challenging topic not only for academic researchers but also for stakeholders and industry owners.

Ladies and gentlemen,
Since 2011, the industrial sector has been integrated with the online system known as industrial revolution 4.0. The first industrial revolution was marked by the use of steam engines to replace human and animal power. The second stage of the revolution was marked by the utilization of electrical power and the concept of mass production. Furthermore, the application of automation technology brought the industrial revolution to its third stage. Tremendous revolution happened when information and communication technology was introduced and fully utilized in industrial area, of which the condition brought the world in the fourth stage of the industrial revolution. The utilization of this technology changed not only the production process, but also across the industrial chains that result in a new digital-based business model which can achieve higher efficiency and better quality in industrial products. The consequences of this revolution are the increase of production efficiency as well as changes in the employment prerequisite. There is an increasing demand for new manpower, whilst the machines are replacing the role of workers. This condition leads to the importance of a new and more advanced method of preparing human resources that are ready to compete in the industrial revolution.

Ladies and gentlemen, in regard to prepare Indonesian human resource in facing the era of media convergence, there are at least two aspects that need our attention, namely the quality of human resources in accordance with the requirement of the digital-based industry and the equal distribution of qualified human resources especially in suburban and urban areas. Both aspects could be meant as a challenge and an opportunity for the higher education especially technology and vocational education to innovate and harmonize curriculum that connects with the industry. Thus, this Conferences becomes a perfect momentum for technology and vocational education to join and strengthen steps in preparing graduates that are ready to compete in the industrial revolution 4.0. Therefore, by starting with **"*Bismillahirrahmanirrahim*" The Conference and Convention of Association of Technology and Vocational Education or APTEKINDO 2018, is officially started"**

Ladies and gentlemen, we would like to thank the keynote speakers who are willing to attend and share knowledge in today's Conference:

1. Prof. Dr. Muhadjir Effendy, MAP.Minister of Education and Culture, Republic of Indonesia
2. Michael Freiherr Von Ungern–Sternberg, ***Extraordinary and Plenipotentiary Ambassador of the Federal Republic of Germany to Indonesia, ASEAN and Timor-Leste.***
3. Prof. Dr. Wenny Rahayu, *La Trobe University Victoria* **(Australia)**
4. Prof. Dr. Muchlas Samani, M.Pd., *Rector Universitas Negeri Surabaya (2010-2014).*

We also would like to thank the authors and all participants of the convention who have participated and contributed to sharing the knowledge and ideas. Hopefully, what we share and get here today can give benefits and contribute to improve a competitive atmosphere in Indonesia, Aamiin YRA.

Surabaya, July 2018
Universitas Negeri Surabaya
Rektor,

Prof. Dr. Warsono, M.S.

WELCOME SPEECH BY THE DEAN OF FACULTY OF ENGINEERING

at the International Conference and National Convention of

***AsosiasiPendidikanTeknologidanKejuruan Indonesia* (APTEKINDO) 2018**

Rich Palace Hotel, 12 July 2018

Assalamu'alaikum Warahmatullahi Wabarakatuh.

His Excellency, Rector of Universitas Negeri Surabaya
Respectable the Head of Universities asthe members of APTEKINDO
Distinguished Keynote Speakers
Honorable authors and Participants

Alhamdullilahirobbil alamiin. Thanks God. First of all, let us express our gratitude to Allah SWT because of his grace and blessings we are able to attend the 9th International Conference and convention of ***Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia* (APTEKINDO)** and the 19th workshop of the Technology and Vocational Education forFPTK/FT/FTK-JPTK in Indonesia. It is an honor for us, the Faculty of Engineering, Universitas Negeri Surabaya, to host this yearConference and convention.

On behalf of *Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia* (APTEKINDO),wewould like to welcome keynote speakers, authors, delegates and participants from technology and vocational education to the city of heroes, Surabaya.

Today, we meet in Surabaya to attend a biennial agendanamed APTEKINDO International Conference and Convention and National Workshop of the FPTK/FT/FTK-JPTK. Following the mandate from the 2016 APTEKINDO Convention in Medan, this year's Conference is held in Surabaya hosted by the Faculty of Engineering, Universitas Negeri Surabaya.

Ladies and Gentlemen, the theme of this year Conference is "*Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0*". The theme is chosen due to the fact that we have to quickly respond and act accordingly to the effects of the industrial revolution on vocational education. Well-programmed and structured effortsshould be undertaken to ensure if technology and vocational education canproduce globally competitive graduates especially for industrial revolution era.

Numbers of important topics for technology and vocational education are discussed in this Conference. Thetopics includeTechnical and Vocational Teacher Competencies, Technical and Vocational Education Curricula, Technical and Vocational Education Models, Technical and Vocational Education Evaluation, Technical and Vocational Education Policy, Public-private Partnership in Technical and Vocational Education, Technical and Vocational Education Management, Technopreneurship, and Competence Certification.

Today's Conference has several outcomes. The accepted articles will be submitted for proceeding publication indexed by Atlantic Press. Meanwhile, the rejected articles by Atlantic Press will be published in the International Proceedings with International Standard Book Number (ISBN). Moreover, the articles written in Bahasa Indonesia will be published in the National Proceedings with ISBN.

Ladies and Gentleman, this meeting must be meaningful as a venue to communicate among researchers, academics, and members of FPTK / FT / FTK-JPTK from different universities as well as from related industries. By this regular Conference and convention, we can make a strong communication network and create innovative breakthrough and substantial blueprint of different aspects such as institutional quality, field study, and curriculum. We hope that this forum plays an important role in developing technology and vocational education to face the industrial revolution 4.0.

Finally, we would like to thank the organizing committee led by Mr.Tri Wrahatnolo, M.Pd., M.T., who gave an extraordinary support. Moreover, we would like to express our appreciation and gratitude to the members of steering committee from various regions in Indonesia, delegates, SC and OC members, sponsors, as well as personal or institutional support that make this event well-organized. I apologize if there are shortcomings from my part.

Good luck with the Conference of Indonesian Association of Technology and Vocational Education, APTEKINDO 2018, and wish the best improvement for technology and vocational education in Indonesia. Thank you.

Wassalammu'alaikum Warahmatullahi Wabarakatuh

CHAIRMAN'S SPEECH

at the International Conference and National Convention of

***Asosiasi Pendidikan Teknologi dan Kejuruan Indonesia* (APTEKINDO) 2018**

Rich Palace Hotel, 11-14 July 2018

Assalammu'alaikum Warahmatullahi Wabarakatuh.

His Excellency, Rector of Universitas Negeri Surabaya,
Respectable the Head of Universities, members of Aptekindo, Keynote speakers, Authors, and fellow participants of Aptekindo Conference and convention 2018.

Alhamdulillah, no words could represent the feelings but the gratitude of the presence of Allah SWT, for His blessings, so that we can attend APTEKINDO Conference with the theme "*Revitalization ofTechnical and Vocational Education to Face Industrial Revolution 4.0"*.

In this pleased occasion, we would like to welcome all keynote speakers, authors, and participants of the Conference to this city of heroes, the city of heroic histories, Surabaya. We would like also to welcome to APTEKINDO 2018 Conference and convention held at the Rich Palace Hotel Surabaya, 11-14 July 2018.

The theme of this year Conference is "*Revitalization of Technical and Vocational Education to Face Industrial Revolution 4.0*.". This theme is chosen to respond to the development and acceleration of industrial revolution 4.0 that has been impactful in various countries. This industrial revolution has connected the utilization of machines to an internet system. To face such phenomena, Indonesian government through the Ministry of Industryhas launched a program called "Making Indonesia 4.0". Currently, the government is focusing on industries that support the development of the industrial revolution such as food and beverage, electronics industry, automotive, textile and clothing, and chemical industries.

In addition, vocational education plays an important role in preparing competent and competitive human resources. That is, Faculty of Technical and Vocational Education or *Fakultas Pendidikan Teknik dan Kejuruan* (FPTK) in Indonesia aims to compile excellent ideas and vision, which later could be shared through Conferences, conventions or meetings, and also be useful to encounter industrial revolution 4.0.

Today's Conference will present competent keynote speakers in the field of technology and vocational education, who are:

1. Prof. Dr. Muhadjir Effendy, MAP. Minister of Education and Culture, Republic of Indonesia
2. Michael Freiherr Von Ungern–Sternberg, Extraordinary and Plenipotentiary Ambassador of the Federal Republic of Germany to Indonesia, ASEAN and Timor-Leste.
2. Prof. Dr. Wenny Rahayu, La Trobe University Victoria (Australia)
3. Prof. Dr. Muchlas Samani, M.Pd., Rector of Universitas Negeri Surabaya (2010-2014).

In addition, I would like to point out that there are 602 participants from 17 different universities participating in today's Conference involving:

1. Universitas Palangka Raya
2. Universitas Gorontalo
3. Universitas Islam Negeri Ar Raniry Aceh
4. Universitas Negeri Solo
5. Universitas Negeri Menado
6. Universitas Pendidikan Ganesha
7. Universitas Nusa Cendana
8. Universitas Malang
9. Universitas Negeri Jakarta
10. Universitas Negeri Padang
11. Universitas Negeri Yogyakarta
12. Universitas Pendidikan Indonesia
13. Universitas Negeri Makassar
14. Universitas Negeri Semarang
15. Universitas Negeri Medan
16. Universitas Negeri Surabaya
17. Universitas PGRI Adi Buana Surabaya

There are 491 articles submitted to this Conferences covering papers and posters. 76 articles were accepted to Atlantic Press, 156 articles published in international proceedings with ISBN, dan 129 articles published in the national proceedings with ISBN. All articles will be available for an online access through the Atlantis Press official website and through APTEKINDO 2018 website.

Today's Conference isactually held with the helps and good cooperation of various parties. Therefore, we would like to express our gratitude to the Minister of Research, Technology and Higher Education, Rector of Universitas Negeri Surabaya, keynote speakers, participants, sponsors, and other stakeholders for the supports. We also send our highest appreciation to the committees who have worked hard to succeed this Conference.

At last, we hope that all participants get benefitsand knowledge that can contribute to reinforce vocational education and technology in facing the industrial revolution 4.0. WELCOME TO APTEKINDO CONFERENCE AND CONVENTION 2018, Thank you.

The Influence Of Learning Media And Technique Drawing Capability Towards The Learning Outcomes Of Cnc Ii Tu-2a Machine Tool

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***Abstract**--This study aims to determine the learning outcomes of students on CNC Machine Tools TU-2A: (1) using media instructional Video is different from Powerpoint, (2) For students with high engineering drawing abilitiy, using Video is different from Powerpoint, (3) For students with low abilitiy, using Video is different from Powerpoint, and (4) The interaction between media instructional with engineering drawing ability. The used method in this research is quasi-experimental with design of 2x2 ANOVA factorial, where significance level α = 0.05. The study outcome of university student in CNC TU-2A Machine Tools lesson showed: (1) the students who learned using video medium obtained the higher learning result than using powerpoint medium, (2) For university students who have high technique drawing capability, using video medium in learning gave higher learning outcomes than powerpoint medium, (3) using powerpoint medium gave higher study result than using video medium for university students who have lower technique drawing capability, (4) there is interaction between learning media and technique drawing capability.*

***Keyword**: instructional media, technical drawing ability, and the learning outcomes.*

I. INTRODUCTION

The Computer Numerically Controlled (CNC) Machine Tools course is one of materials which is taught by Department of Mechanical Engineering Education, Engineering Faculty of State University of Medan to mechanical engineering diploma students (D-III). Most of materials course which taught in the classroom are still in textbook form and download materials from staffsite. Therefore, researchers do research to know whether learning media using multimedia can help university students in their study.

Based on the previous research which has been done by author, there were 60% of respondents who stated strongest agree and agree about it was needed to develop information and communication technology and development of CNC Machine Tools basic concept of learning media.This means that the necessity of interactive multimedia for CNC Machine Tools course as strongest exact learning media.

Based on the above problem, it is needed to do research about the evaluation of learning media application by using video and powerpoint media in CNC course. The aim of using powerpoint and video media is to increase university students learning concentration by visual so that university students can understand course materials. Furthermore, university student learning progress will be controlled by their own will and supervision of skills practice can be done according to student progress. The another variable which also determine the success of CNC course learning is student characteristic. Technique drawing capability is the most important characteristic which comes from in man.

This problem research can be formulated such as: (1) Is there difference in university student learning outcomes of CNC TU-2A Machine Tools course by using video or powerpoint media? (2) Is there difference between by using video and powerpoint as learning media towards university student learning outcomes especially university students who have high technical drawing skills. Is there difference between by using video and powerpoint as learning media towards university student learning outcomes especially university students who have high technical drawing skills. (4) Is there any influence of interaction between using different learning media and university technical drawing skill towards CNC TU-2A Machine tools courses outcomes.

The aims of this research are: (1) To know the differences of university student learning outcomes at CNC TU-2A Machine Tools course by between using video and powerpoint media as learning media. (2) To know the difference of student learning outcomes which students whose high technical drawing skills by using video and powerpoint media in CNC TU-2A Machine Tools course. (3) To know the difference of student learning outcomes which students whose weak technical drawing skills by using video and powerpoint media in CNC TU-2A Machine Tools course. (4) To know the interaction between learning media with university student technique drawing skills on learning result at CNC TU-2A Machine Tools course.

John Power (1987) in his book "*Computer Automated Manufacturing*, stated that the utilization of

CNC Machine Tools can be viewed from three basic components in CNC Machine Tools equipment system such as instructional programme, control unit and tools machine itself. The management of these three basic components requires skilled labour, not just a pressing button skill or arranging the cutting tool on the feeding/shaving workpiece, but requires special knowledge, such as (1) *planning* consists of information processing capability from workpiece which will be made, (2) *programming* consists of the step of planning and determining or machine tools movement consists of instruction sequence by computer, and (3) *execution* consists of trial until machining process on the actual object.

The making of CNC Machine Tools programme is basically to solve a problem by translating order or workpiece picture to abstraction of form and workpiece processing.. Learning with CNC Machine Tools programme is related to learning which according to Gagne (1992) such as intellectual skills where it is one of the five categories of skills learned. The five skills are such as (1) intellectual skill, (2) cognitive media, (3) verbal information; (4) motor skill; and (5) attitude. Based on learning material classification, the aim of learning and by learning process approach that leads to the achievement of one of the human capabilities of intellectual skills, thus the main theoretical study in this study used the Gagne taxonomy. The five skills learned in Gagne Taxonomy have the same goal such as to make easy university students learn according to their learning goals. The learning media is increasingly needed if associated with limited problem of learning time unit since learning media help repeating the appearance of a particular process. In learning CNC machine tools, simulator or simulator has been available, they tend not to equip the simulation equipments with the consideration of efficiency, so that real direct learning is done. The problem is which is better actual learning media or using CNC Machine Tools simulator or using multimedia learning.

The media is various types of components in a student environment that can stimulate it to learn. Arief S. Sadiman (2012) argued that: "Media is any physical tool that can present the message and stimulate students to learn. While, the learning media, according to Hamzah and Nina (2010:122) is all of communication tools form that can be used to convey from the sources to students, and its goal is to stimulate them to participate in media learning activities. Besides, being used to deliver full learning, can also be utilized to convey certain parts of the learning activities, provide strengthening and motivation.

While, Arief S. Sadiman (2012) stated that video is audio visual media featuring images and sound. Messages presented can be facts (events, important events, news) or fictive (such as stories), can be informative, educative and instructional.

According to Arsyad (2013:233) powerpoint media advantages are (1) Be able to display objects that are not physically present. (2) Be able to develop learning materials especially for reading and listening easily. (3) Have the ability to combine all media elements such as text, pictures, videos, graphics, tables, sounds and animations become an integrated presentation. (4) Be able to accommodate students that suitable with their learning modalities especially for students who have visual type, auditive, kinesthetic and other types.

Technical drawing as proposed by Bertoline, Wiebe, Miller and Leonard (1995) is a nonverbal method in communication information. It means that through technical drawing is actually the architects are communicating by nonverbal to make their thinking abstractions into more concrete and easy to understand.

According to Heij & Bruijn (1995), technical drawing aims to facilitate people to work on goods and can avoid the use of materials that are not needed. In other words, engineering drawings help streamline work at the factory and prevent wasteful use of materials.

From some of the above opinions, what is meant by technical drawings are the rules of communicating or speaking in engineering drawings called as engineering drawing standards. Eventhough, it can be said that technical drawings is technique language that can manage the way of conveying information through images or as communication tools as can be found in spoken or written language.

II. METHOD

This research is conducted in Mechanical Engineering Department (Diploma-III Programme), Engineering Faculty, The State University of Medan.

The population is diploma students in Mechanical Engineering Department, Engineering Faculty, Universitas Negeri Medan (The State University of Medan) who take CNC course in First Semester 2016/2017. The sample is 22 students.

This research used experiment method with 2x2 factorial design, quasy-experiment design. Through this design will be compared the influence of the delivery of learning by between using video media and powerpoint media. The variables will then be reviewed in the study with the design shown in Table 1.

Table 1 Research Design Matrix

Learning Media / Technical Images Capability	Learning Media with using video (A1)	Learning Media with using powerpoint (A2)
High Technical Images Capability (B1)	***A1B1*** 5	***A2B1*** 5
Low Technical Images Capability (B2)	***A1B2***	***A2B2***

	6	6

Note:

A1B1: student learning outcomes that are taught by learning delivery using video media with high technical drawing abilities.

A2B1: student learning outcomes that are taught by learning delivery using powerpoint media with high technical drawing abilities.

A1B2: student learning outcomes that are taught by learning delivery using video media with low technical drawing abilities.

A2B2: student learning outcomes that are taught by learning delivery using Powerpoint media with low technical drawing abilities

Data analysis techniques used are descriptive and inferential statistical techniques. Descriptive statistical techniques are used to describe data. Inferential statistical techniques are used to test the research hypothesis, where the inferential technique used is a two-lane analysis of variance (ANOVA) with a significant 0.05%. If there is the interaction between variables, then the analysis is continued different test by using Scheffe test with consideration if the number of research subjects each cell is not the same.

Based on the research hypothesis that has been formulated in the previous, thus this can be prepared statistical hypothesis to be tested as follows:

1. First Hypothesis
   Ho: uA uA $\leq$ $_1$ B $_{1\ 2}$ B $_1$
   Ha: uA $_1$ B $_{1>}$ uA $_2$ B $_1$
2. Second Hypothesis
   Ho: uA uA $\leq$ $_1$ B $_{2\ 2}$ B $_2$
   Ha: uA $_1$ B $_{2>}$ uA $_2$ B $_2$
3. Third Hypothesis
   Ho: A x B = 0

III. RESULTS AND DISCUSSION

Table 2. The Summary of Data Results and Calculation of Descriptive Analysis

Variable		Instructional Media						Total	
		Video			Powerpoint				
Technical Image Capability	High	Value	N	5	Value	N	5	N	10
		98	ΣX	459	87	ΣX	403	ΣX	862
		96	□	91800	84	□	80600	□	86.2
		91	s^2	25,700	80	s^2	25,800	s^2	57.733
		87	S	5.070	78	S	5.079	S	7.598
		87	□	42239	74	□	32585	□	74824
	Low	71	N	6	71	N	6	N	12
		68	ΣX	393	71	ΣX	400	ΣX	793
		67	□	65,500	69	□	66.667	□	66.083
		67	s^2	20300	69	s^2	27467	s^2	20544
		60	S	4.506	60	S	5.241	S	4,699
		60	□	25843	60	□	26804	□	52647
Total			N	11		11	11	N	22
			ΣX	852		852	803	ΣX	1655
			□	77455		77455	73,000	□	75.227
			s^2	209.073		209.073	77,000	s^2	141.422
			S	14459		14459	8,775	s	11892
			□	68082		68082	59389	□	127471

Results

For the purpose of hypothesis testing using 2 x 2 factorial variance analysis (ANOVA) technique and Scheffe advanced test required the average price of each group. The summary Data of Learning result of CNC TU-2A Machine Tool can be seen in Table 2 by using descriptive analysis. After the data in Table 2 was processed with two factorial 2x2 Anova, the analysis result as shown in Table 3 was obtained.

Table 3. Summary of Anova Factorial Calculation Result 2 x 2

Source variations	Dk	JK	RJK	F_{count}	$F_{table\ (1.18)}$ ($\alpha = 0.05$)
Instructional Media	1	109.136	109.136	7,300	4.41
Technical Image Capability	1	2207347	2207347	89319	
Interaction	1	208.547	208.547	8,439	
Error	18	444.833	24713		
Total	21	2969.864		**Significant**	

***There** Are Differences In Learning Outcomes Of CNC TU-2A Machine Tools Courses That Students Who Learned By Video Media And Powerpoint Media.*

The results of the calculation of variance analysis of the average learning outcomes of CNC TU-2A Machine Tools course which learned by video media equal to □= 77.45 and 2A Machine Tools course which learned by powerpoint media equal to □= 73.00, calculation results obtained F_{count} equal to 7.30, while the value of criticism F_{table} with df = (1.18) and α = 0.05 is equal to 4.41. These results indicate that the F_{count} = 7,300> F_{table} = 4.41 so that the zero hypothesis (Ho) is rejected, thus the research hypothesis which states there are differences in learning outcomes of students in CNC Machine Tools TU-2A course that acquire learning delivery with the video media learning and Powerpoint media is true.

The Differences in Learning Outcomes of TC-2A CNC Machine Tools Course in Students Who Have Higher Technical Image Capabilities.

The results of calculation of variance analysis about the average learning outcomes of CNC Machine Tool TU-2A courses which has high technical drawing capability of □= 91.80 and the average learning outcomes of CNC Machine Tool TU-2A courses which has low technical drawing capability of equal to □= 66.66, calculation results obtained F_{count} equal to 89 319 and the critical value of F_{table} with df = (1.18) and α = 0:05 is 4.41. These results indicate that the F_{count} = 89 319> $F_{table.}$ = 4.41 so that the Hypothesis Zero (Ho) is rejected, thus the hypothesis of research that states that there are differences in student learning outcomes that have high technical drawing skills, on CNC TU-2A Machine Tools course who obtain the delivery of learning with Video media and Powerpoint media is tested the truth.

There Is An Interaction Between Learning Media And Technical Image Capabilities In Influencing The Learning Results Of CNC Machine Tool TU-2A Course.

The results of the calculation of variance analysis of the average learning outcomes of CNC TU-2A Machine Tools course for students in each group treatment are as follows: The average learning outcomes of CNC Teaching Machine TU-2A course for students who are taught with video learning media and has high technical image capability is 91.80 and the learning outcomes of CNC TU-2A Machine Tools course for students who are taught with video learning media and has low technical image capability is 65.50 whereas learning outcomes of CNC Teaching Machine TU-2A courses for students who are taught with powerpoint learning media and has high technical image capability is 80.60 and learning outcomes of CNC Machine Tools TU-2A course for students who are taught by powerpoint media and has low technical drawing skills is 66.66.

The result of 2x2 factorial ANOVA calculation is obtained F_{count} = 5,555 and the value of criticism F_{table} with dk = (1.18) and α = 0.05 is 4.41. These results indicate that the F_{count} = 5,555> $F_{table.}$ = 4.41 obtained F_{count} = 5,555> $F_{table.}$ = 4.41, thus the research findings conclude, that Ho is rejected Ha is accepted. The research hypothesis states: There is an interaction between learning media and technical drawing ability in giving influence to learning result of Machine Tool CNC TU-2A is tested truth at significance level 0,05. The interaction between instructional media and technical drawing ability in giving influence to learning student outcome of CNC TU-2A Machine Tools course can be seen graphically in figure 1.

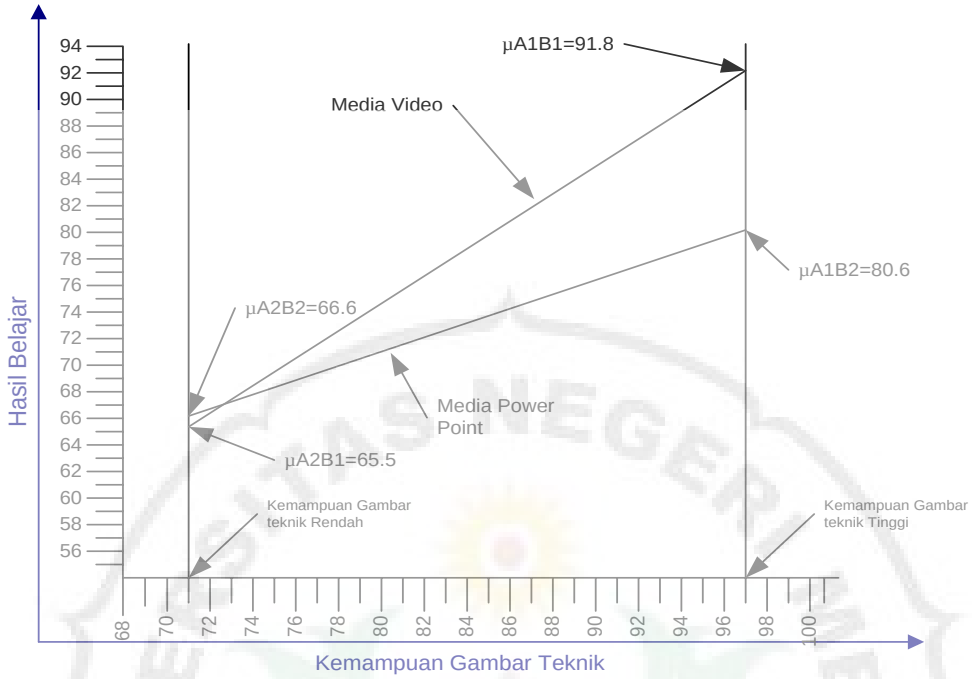

Figure 1. Interaction between learning media and technical drawing ability in giving influence to learning outcome of CNC TU-2A Machine Tools Course

Based on the result of the third hypothesis testing which stated that there is an interaction between learning media and technical drawing ability in influencing the learning result of CNC TU-2A Machine Tools course for students, so that it is necessary to test the average of difference between two propositions, thus for it used Scheffe Advanced test. Figure 1 shows that there is an interaction between learning media and technical drawing ability in influencing the learning result of CNC TU-2A Machine course for students, however video learning media is more dominant than learning media by using Powerpoint. other words, more better learning media used by the lecturers in delivering the teaching materials, so that more higher achievement of learning result of CNC TU-2A Machine Tools course for Students. On the other hand, the technical drawing ability factor needs to be considered because it is evident that the technical drawing ability influences the learning outcomes of the CNC TU-2A Machine Tools course for students. The results using the Scheffe Test can be seen in Table 4.

Table 4. The Summary of Test Results using Scheffe Test

The average value of the group Which is compared	F_{count}	$F_{table\ (3.18)}$ $\alpha = 0.05$	Information
μA1B1 with μA2B1	3, 562	3.16	Significant
MA1B1 with μA2B2	8, 355	3.16	Significant
μA1B1 with μA1B2	11701	3.16	Significant
μA2B1 with μA2B2	4.637	3.16	Significant
μA2B1 with μA1B2	4.662	3.16	Significant
μA1B2 with μA2B2	- 0406	3.16	Not significant

Discussion

a. *The Study Outcomes Of Students Who Have Higher Technical Image Capability In CNC TU-2A Machine Tools Course That Delivered By Using Video Media Is Higher Than By Using Powerpoint Media.*

The results of this study have shown that the above description, can be understood that the lessons of CNC Machine Tool TU-2A courses have a very wide scope so that the learning process should provide the opportunity for the students to ease the understanding of the material CNC Machine Tool TU-2A courses really understood and believed by students. Therefore, lecturers are expected to have knowledge and understanding about learning media, because knowledge and understanding about learning media are very important as one of the efforts in providing experience and achievement of optimal learning objectives. Lecturers are required to elaborate the quality of learning and must pay attention to basic and the goal of the lecture that will be taught, as well as consider the students' characteristics.. According to Muhibbin's opinion (2004: 16) stated that among the knowledge that needs to be mastered by the teachers/lecturers is the knowledge of applied psychology that are closely related to the learning process of learners/students. In learning process, lecturers and their teaching way factors are very important factors. It means that the mastery of Lecturers to instructional media is needed to improve the professional skills of lecturers in teaching, therefore lecturers must be able to determine the most appropriate and suitable media towards objectives and materials to be delivered.

From the description above, it can be understood that the learning result of CNC Teaching Machine TU-2A courses for students who are taught with video learning media is better than the students who are taught by powerpoint learning media.

b. Students Who Have Higher Technical Image Ability Obtain higher learning outcomes of CNC TU-2A Machine Tools than students Who Have Low Technical Image Capabilities

This results have shown that students who have high technical drawing ability get higher average learning outcomes of CNC TU-2A Machine Tools courses compared to students with low technical drawing ability. The ability of technical drawing is one of the student's characteristics which is the basic understanding that already existed in the students to do better, more effectively and more efficiently from previous work. The basic capital to do better in the student is an important information needed by lecturers that can be useful as a basis for determining appropriate learning media so that it can help to improve learning outcomes.

The role of student's technical drawing skills is very useful in the learning activities of CNC TU-2A Machine Tools course because this lessons demands creative and innovative ways of thinking that will provide a broad thinking horizone for students to find alternative ways in developing new things and to search innovative ideas. More broadly, technical drawing ability can create a passion for doing better than ever before. Thus, the ability of technical drawing is important in influencing learning outcomes.

Students who have high technical drawing ability are better able to do their best to accelerate the process of learning problem-solving learning Machine of CNC TU-2A course. While students who have low technical drawing skills are less able to utilize existing learning resources and are unable to work more effectively and efficiently to solve problems.

From the description above, it can be understood that Machine Tools CNC II TU-2A courses have an important role in helping students apply science according to the their expertise's field. High technical drawing ability in students will provide opportunities for these students to find the best way to master and quickly understand the material that is delivered.

Students who have high technical drawing skills will exhibit different learning responses with students with low technical drawing skills.

Students who have low technical drawing skills tend to be less able to examine and learn more about the material of CNC TU-2A Machine Tools course which means that the student does not have the ability to perform from other students. While studying the lecture material of CNC TU-2A Machine Tools courses, it is required to have a thoroughness and desire from within to understand the material of CNC TU-2A Machine Tool courses. Students who have low understanding of TU-2A CNC Machine Tools do not do much or less response in studying CNC Machine Tool Material TU-2A so that in their turn result less maximal learning result.

Based on the above description, it can be concluded that students who have high technical drawing ability get higher learning results of CNC TU-2A Machine Tools courses than the students who have low technical drawing ability.

c. There is an Interaction Between Learning Media And Technical Image Capabilities In Influencing the Learning Results Of CNC TU-2A Machine Courses Tools for Students.

From the description above, it can be understood that there is an interaction between learning media and the ability of technical drawings in influencing the student learning outcomes of CNC TU-2A Machine Tools course.

Based on the above explanation, it can be concluded that there is linkage to the overall of the learning process that lecturer is done in achieving higher learning outcomes. Different learning media give different effect to student's learning result which is related to the technical drawing ability.