

MAPPING THE POTENTIAL OF IAIN PONOROGO ENGLISH EDUCATION STUDENTS IN FACING THE INDUSTRIAL REVOLUTION 4.0

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Abstract: The industrial revolution is changing the way people live today. Everything can change by technological advances that integrate themselves into people's lives, including in the world of education. Indonesia has made 10 national priorities designed to face the era of the industrial revolution 4.0, including redesigning the educational curriculum to adapt to the 4.0 Industrial era, which utilizes technology in learning. It must indirectly be followed by strengthening the competence of prospective teacher students in designing and developing increasingly meaningful learning. Prospective teacher students must be able to develop abilities in facing the development of the times, including mastery of technology and competence according to Law no. 14 of 2005 and 21st-century abilities. This study aims to describe the knowledge of prospective teacher students about technology-assisted learning media and classify the competencies and abilities of the students. In this study, a quantitative approach was used. The respondents were 71 students of the English Language Education (TBI) IAIN Ponorogo. Data analysis was performed using descriptive statistics and cluster analysis. The results of the study showed that TBI students have begun to get to know several technology-assisted learning media such as Google Classroom, Quizizz, and other interactive learning media. However, there are still many who only know one type of media. The results of competency mapping according to Law no. 14 of 2005 and 21st-century abilities show that many TBI students are still included in the low ability group. These results show that students should make more efforts to improve their abilities and competencies before entering society. Students must begin to be active to improve their mastery of technology-assisted learning media to be able to keep up with the world's development.

Keywords: Competence; Learning Media; Technology; 21st-Century Abilities.

INTRODUCTION

The industrial revolution changed the way people live today. Everything can change according to technological advances that integrate themselves into human life. With the increasingly rapid amount of information technology, many online learning sites such as teacher's rooms or YouTube sites make it easier for the world of education to develop. The biggest challenge is that the development of information technology in the world of education is not supported by the development of human resources who manage the world of education, so sometimes students are smarter than their teachers in the use of technology.

English language education (TBI) students of IAIN Ponorogo whose main profile is to become teachers of English subjects, in the face of the industrial revolution 4.0, naturally master technology in optimizing the education carried out. Students must begin to master educational media so that by the time of graduation, they will be able to apply them in classroom learning. Indonesia has made 10 national priorities called "making Indonesia 4.0" designed to face the era

of the industrial revolution 4.0, one of which is to redesign the educational curriculum according to the Industrial 4.0 era, which utilizes technology in learning (Ministry of Industry, 2018).

The results of interviews with TBI students obtained information that, according to students, the abilities they need to support the future along with the times include teaching and learning skills, soft skills, creative and innovative thinking skills, IT skills, communication, literacy, emotional management, ability in terms of technology, ability to speak both formally and non-formally, cognitive and social abilities, ability to adapt to the era of globalization, ability to think critically, self-confidence and able to issue aspirations, computer graphic design skills, teaching ability, good mastery of English, disciplined and responsible attitude.

Research related to the potential of students in facing the industrial revolution 4.0, among others, was carried out by Firman Budi Santoso in 2019, who stated that it is necessary to develop four competencies integrated with technology (santoso, 2019). This research is strengthened by Dewi Mardhiyana and Nur Baiti Nasution in 2019 who stated that universities need to equip students with various competencies in facing the industrial revolution 4.0, namely digital literacy, technology, and humans (Mardhiyana & Nasution, 2019). Another study was conducted by Aprilia Riyana and Muhammad Alie Muzaki in 2019 by utilizing Kahoot in facing the Industrial Revolution Era 4.0. Kahoot is very suitable for use by teachers and students in the face of the industrial revolution 4.0 (Putri & Muzakki, 2019).

In addition to the use of technology in supporting learning, according to research conducted by Heny Sulistyaningrum et al. in 2019, it is known that the initial ability of 21st Century skills of Unirow PGSD students is still very low, so there is a need for learning to improve critical, collaborative, creative, and communicative thinking skills (Sulistyaningrum et al., 2019). This research is supported by Nova Jayanti Harahap 2019, who states that various challenges in the world of education and the existence of the industrial revolution 4.0 need to be prepared early by students. These abilities include the ability to master computer technology, communication skills, the ability to cooperate and collaborate, and the ability to continue to learn and be adaptive to environmental changes (Harahap, 2019).

Competencies that need to be improved in preparing the 21st century generation, according to Nita Nuraini's research conducted in 2017, include the ability to think critically. This is due to prospective teacher students' low level of critical thinking ability. According to her, the ability to think critically is needed by students as a provision to prepare the 21st century generation who can be competitive and solve various challenges in the future (Nuraini, 2017). In addition to the ability to think critically, prospective teacher students' academic and professional competence must also be improved. As the results of Dewi Mardhiyana's research in 2018 stated, many prospective teacher students still have difficulty mastering pedagogic and professional

competencies. Not only that, but students of prospective teachers also have difficulties in mastering skills in explaining teaching materials (Mardhiyana, 2018).

Based on the results of interviews and several previous studies, this study was deemed necessary to map the potential of students who sat in the middle semester, namely in semester 4 and semester 6. This is because semester 4 students have begun to understand and study teaching materials and 6th-semester students still have the opportunity to improve their abilities if they feel that their abilities are still lacking before finally, in the next one year they will graduate from the education they take.

The intended competencies include the level of mastery of technology in learning, competencies by the mandate of Law no. 14 of 2005, which includes pedagogic competence, professional competence, personality competence, and social competence, as well as 21st-century competencies, which are also needed by prospective teacher students including critical thinking ability, collaboration ability, communication ability, as well as creativity and innovation.

Pedagogic competence is an ability that teachers have to manage student learning (Rifma, 2016). Professional competence is the ability that teachers must have in planning and implementing the learning process (Wijaya, 2018). According to Zakiyah Daradjat, personality competence is a competence of a teacher in the field of personality, noble character, wisdom, and authority and to be an example to students (Asrori & Rusman, 2020). According to Asmani Jamal Ma'mur, social competence is the ability of a teacher or lecturer to communicate and interact effectively and efficiently with students, teachers, parents, and the surrounding community (Asrori & Rusman, 2020).

Critical thinking is an intellectual process of conceptualizing, understanding, synthesizing, and evaluating information obtained from observation, experience, reflection, thinking, or communication as a basis for convincing and acting (Lismaya, 2019). The ability to communicate effectively will provide many personal advantages for people. Several studies showed that effective communication is the most important skill to achieve success and happiness in life (Nofrion, 2016). Creativity talks about an idea or ideas. At the same time, innovation talks about how the idea is applied through a process, cooperation, and systematic distribution until the idea is realized. Good innovations always depart from creative ideas (Latuconsina, 2017). The ability to collaborate is demonstrated by its ability to work together in groups and leadership, adapt to various roles and responsibilities, work productively with others, gain empathy in its place, and respect different perspectives (Setiawan, 2019).

Mapping or classifying students based on their potential is carried out by clustering. This clustering process aims to group students based on their characteristics. The results of the cluster analysis provide an overview of the distinctive features that each group has. The amount of potential possessed can be seen from the number of clusters formed so that it can be known how

many students have a certain potential. This study aims to describe the level of student knowledge about technology-assisted learning media and classify their abilities and competencies in the form of competencies according to Law no. 14 of 2005 and 21st-century abilities. The difference between this study and the previous studies lies in the chosen analysis method. Previous studies have used a lot of comparisons, while this research emphasizes the classification of students based on their abilities and competencies.

METHOD

In this study, the independent variables used included pedagogic competence (X_1), professional competence (X_2), personality competence (X_3), social competence (X_4), critical thinking ability (X_5), communication ability (X_6), collaboration ability (X_7), creativity and innovation (X_8), and mastery of technology in learning (X_9). The population used was students of the English Language Education (TBI) Department, Faculty of Tarbiyah, and Teacher Science IAIN Ponorogo who have an active status in the even semester of 2019/2020 class of 2018 and class of 2017. Based on academic data from the faculty, it was known that the number of students of the class of 2018 was 137, and the number of students of the class of 2017 was 99, so the population in this study was 236 students. The sample calculation in this study was carried out using the Slovin formula with the sampling error rate (e) was 10%. The calculation of the sample with the Slovin formula (Sugiono, 2018) is shown in the following formula:

$$\begin{aligned} n &= \frac{N}{1 + Ne^2} \\ &= \frac{236}{1 + (236 * 0,1^2)} \\ &= \frac{236}{1 + 2,36} \\ &= 70,2380 = 71 \end{aligned}$$

Based on calculations, the sample in this study was 71 students. From the calculation results, it was known that the sample of students of the class of 2018 was 41 people, while the students of the class of 2017 were 30 people. Each respondent was then given a questionnaire referring to the grids in table 1.

Table 1. Research Instrument Grids

Variable	Indicator
Pedagogic competence (X_1)	Mastering the characteristics of others (learners)
	Mastering learning theory and educational learning principles
	Develop a curriculum related to the subjects mastered
	Organizing assessment and evaluation of learning processes and outcomes

Variable	Indicator
	Utilizing information and communication technology for learning purposes
Professional competence (X ₂)	Mastering the material, structure, concepts, and scientific mindset that supports the subjects they are taught
	Mastering competency standards and basic competencies of the subjects mastered
	Develop creative learning materials
	Utilizing information and communication technology to develop themselves
Personality competence (X ₃)	Act by Indonesia's national religious, legal, social, and cultural norms
	Presenting oneself as an honest person, noble character, and role model for students and society
	Presenting oneself as a steady, stable, mature, wise, and authoritative person
	Demonstrate a work ethic, high responsibility, a sense of pride in being a teacher, and a sense of self-confidence.
Social competence (X ₄)	Be inclusive, act objectively, and not discriminatory
	Communicate effectively, empathically, and politely
	Communicate with the community of one's profession and other professions orally and in writing or other forms
Critical thinking ability (X ₅)	accurate and seeking accuracy
	clear and search clearly
	Open-minded
	resist impulsiveness
	taking a position when the situation requires it
Communication skills (X ₆)	sensitive to the feelings and level of knowledge of others
	clearly express ideas
	communicate effectively with a diverse audience
	communicate effectively in a variety of ways
Collaboration capabilities (X ₇)	Communicate effectively for a variety of purposes
	work towards the achievement of group goals
	effective use of interpersonal skills
	contributes to the maintenance of the group
Creativity and innovation (X ₈)	effectively performs a variety of roles
	Intensely engage in tasks even when answers or solutions are not immediately visible
	pushing the limits of knowledge and ability
	generate, trust, and maintain one's standards
Mastery of technology in learning (X ₉)	generates a new way of looking at situations beyond the limits of the standard
	Much interoperable learning media

The data obtained are further analyzed by the following steps

1. Testing the validity and reliability of test instruments
2. Research data collection

3. Formation of factors for each of the research variables using factor analysis
4. Make a description of the variables for the use of technology-assisted learning media
5. Make a mapping in this case utilizing the hierarchical cluster analysis method
6. Interpretation of results

RESULTS AND DISCUSSION

Validity and Reliability Testing

Validity and reliability testing was carried out on trial data totaling 30 respondents. Based on the test results, it is known that all question items asked are valid because all sig values generated were less than 0.05 and meet the reliability criteria because they had a Cronbach alpha reliability value of more than 0.6 (Widoyoko, 2012).

The Use of Technology in Learning

With the development of technology in learning, there are more and more options that students can use in designing learning or following existing learning. However, not all students can master all existing learning media. This can be seen in Figure 1 and Figure 2.

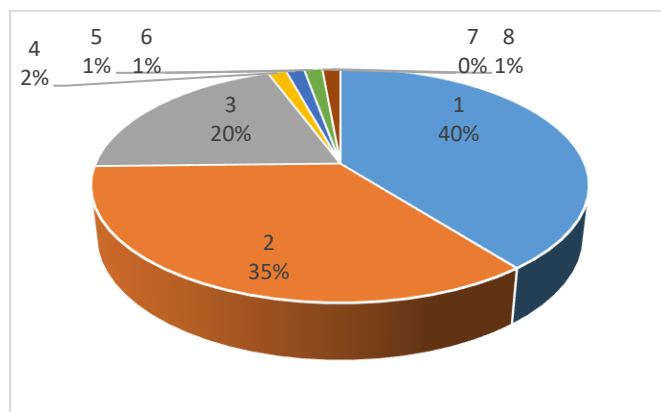


Figure 1 The Amount of Media Mastered by Students

Based on Figure 1, it is known that 40% of TBI students in this study only mastered one type of learning medium, 35% mastered two learning media, 20% mastered three learning media, and only a small part mastered four to eight learning media. This result shows that students need to learn more technologically assisted media to support learning. This is because the world is growing, and when prospective teachers' students cannot develop fun and diverse technology-assisted learning, they will be further left behind by the times. Moreover, today's younger generation is increasingly literate about technology. So, this is a challenge for prospective teacher

students to further develop the level of technological mastery ability in developing fun and varied learning media.

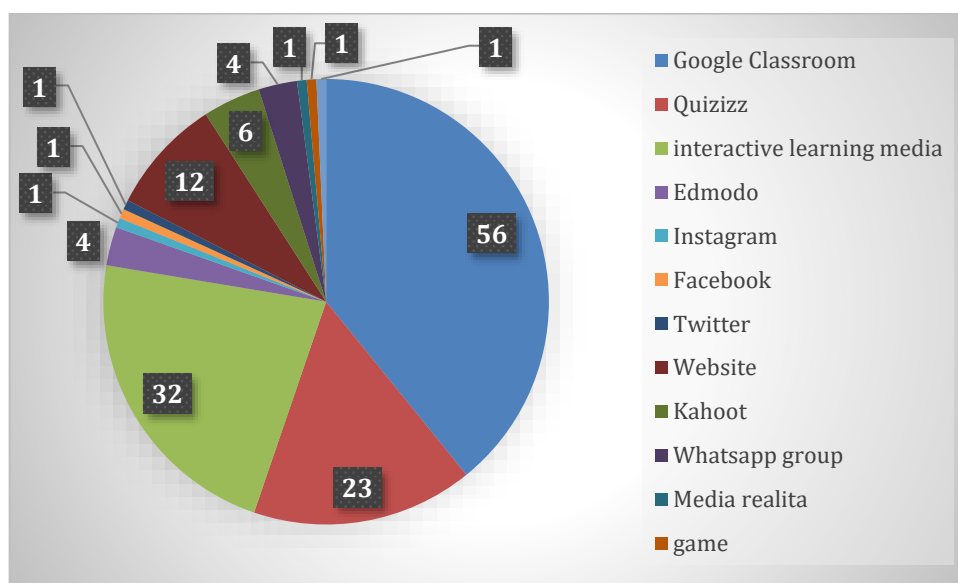


Figure 2 Types of Media Mastered by Students

Figure 2 shows the types of technology-assisted learning media known and utilized by TBI students in semesters 4 and 6. Based on the picture, it is known that the type of technology-assisted learning media that was most mastered was Google Classroom, which is 56 students from a total of 71 students who were respondents in this study. It shows that students are very familiar and think Google Classroom is easier to use. A total of 32 students were able to master interactive learning media, 23 students were able to master Quizizz, 12 students mastered the website and Kahoot, and 6 students the rest were in the form of other social media.

Quizizz as one of the learning media needs to be studied for its use by prospective teacher students because of its benefits. This is in line with the research of Wihartanti et al. (2019), which stated that learning using the quizizz application can grow critical thinking skills and is very suitable to be applied to learning in the era of the industrial revolution (Wihartanti et al., 2019). In addition to Quizizz, Kahoot also needs to be studied by students because this media is very useful in learning. This is to research conducted by Nurul Fazriyah et al. (2019), which stated that the use of Kahoot application in learning is one way to make students interact in learning (Fazriyah et al., 2020), as well as research by Aprilia Riyana and Muhammad Alie Muzaki (2019) by utilizing Kahoot in facing the Era of the Industrial Revolution 4.0. Kahoot is very suitable for use by teachers and students in the face of the industrial revolution 4.0 (Putri & Muzakki, 2019).

This result shows that the types or variations of media controlled by students are still only centered on a few media. Of course, this must be followed up and improvements are made so that at least students can master 3 different types of media so that the variety of learning can be fun.

One media that needs to be mastered is Google Classroom because it is a container to hold all materials in one container to make it more accessible to students. Because of its container nature, Google Classroom can be equipped with fun media, for example, students start trying to create interactive learning media to help students learn the media that can be opened anywhere and anytime. Google Classroom is also equipped with videos or practice questions. In classroom learning, students must be able to take advantage of the sophistication of technology that already exists today. It is undeniable that almost every student has a handphone, so students must start learning to take advantage of HP by making quizzes when the atmosphere in the classroom is not fun or boring. Students can use Quizizz, Kahoot, or other applications.

Classification of Student Competencies According to Law No. 14 of 2005

Figure 3 shows the dendrogram of student classification based on competence according to Law No. 14 of 2005. These results show that students can be grouped into three represented in blue, red, and green.

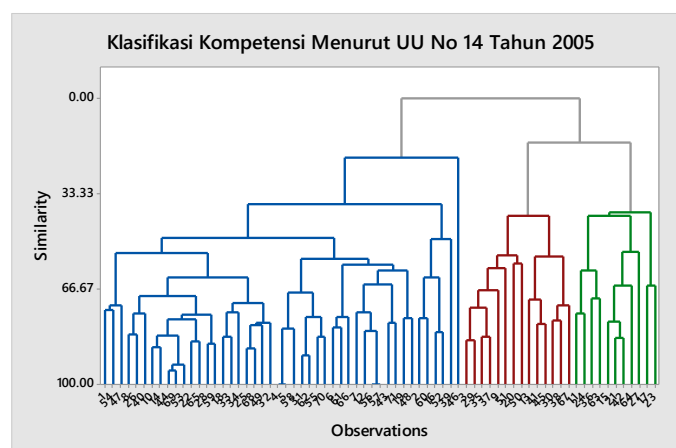


Figure 3 Classification of Student Competencies According to Law No. 14 of 2005

Figure 3 also shows that the group represented by blue has the most members compared to other groups, followed by the group that is red and finally the green group. The average magnitude of the values of each factor in each group is shown in table 2 below.

Table 2. Average Value of Competency Factors According to Law No. 14

Factor	G1	Total	Mean	Factor	G1	Total	Mean
X ₁ . FAC1	1	46	-0,236	X ₃ . FAC1	1	46	-0,16
	2	14	0,648		2	14	1,155
	3	11	0,165		3	11	-0,799
X ₁ . FAC2	1	46	-0,0167	X ₃ . FAC2	1	46	-0,443
	2	14	0,915		2	14	0,666
	3	11	-1,095		3	11	1,004
X ₂ . FAC1	1	46	-0,282	X ₃ . FAC3	1	46	-0,021

	2	14	0,895		2	14	0,419
	3	11	0,042		3	11	-0,445
X ₂ . FAC2	1	46	-0,139	X ₄ . FAC1	1	46	-0,444
	2	14	0,717		2	14	0,918
	3	11	-0,332		3	11	0,688
X ₂ . FAC3	1	46	-0,302	X ₄ . FAC3	1	46	0,055
	2	14	0,482		2	14	0,779
	3	11	0,651		3	11	-1,219

Source: Data Processed 2020

Table 2 shows that the first group consists of 46 students, the second group consists of 14 students, and the third group consists of 11 students. In addition, the average in the first factor tends to have the lowest average value among the other groups, the second group has the highest average, and the third group is in the middle. So it was concluded that the competence of TBI students according to Law no. 14 of 2005 is still relatively low, namely 46 people, in the medium group as many as 11 people, and those who are included in the high group as many as 14 people.

The position of the distribution of data for each factor according to the formed group can be seen in Figure 5. These results support the results shown in Table 2, which show that the first group belongs to the low group, the second group is the high group, and the third group belongs to the medium group.

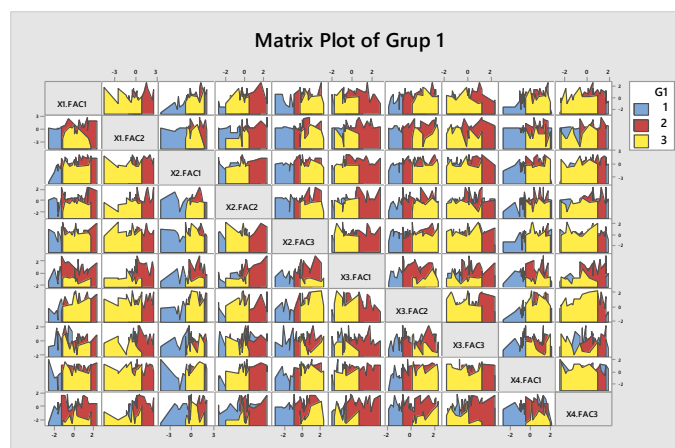


Figure 4 Matrix Plot of Student Competency Classification Results According to Law No. 14 of 2005

The results of the classification of student competencies according to Law No. 14 of 2005 indicated that students are divided into three groups. The proportion of members for each group is different. This is understandable because each student has a different level of ability depending on the arrest obtained by the student himself to the material or knowledge that exists.

In general, the classification results showed that of the 71 students sampled in this study, 46 students were classified as having a low level of competence, 11 people were in the medium group, and 14 people were included in the high competency category. This result illustrates that students still do not fully master certain necessary competencies. This is possible because 4th-semester students have not experienced directly going into the field to design learning, make observations on students and carry out several other necessary activities.

This result shows that students need the activity of introducing the conditions in the field to be able to recognize what they will be faced with after graduation later. In addition, it takes high effort and hard work so that students can have sufficient capital before finally graduating and entering the real community. Students with moderate and high levels of ability, do not just think casually. It is necessary to continue to develop themselves to create a new experience and hone the abilities that have not been obtained so far as capital for the future.

Increasing competence is something that must be done by all students when they want to become good teachers. Starting from pedagogic, professional, personality, and social competence. These four competencies are owned and developed by TBI students as prospective English language teacher students. The increase of one competence will indirectly increase the other competence. This can be seen from the results of the correlation that has been carried out. When students begin to improve their pedagogical competence, in this case, mastering learning theory and evaluation well and variously, students are indirectly able to have professional abilities in the form of developing learning materials and media for students. Not only that, when students begin to realize the importance of personality competence in the ability to communicate broadly, students' ability to communicate indirectly is getting better and more honed because communication activities are often carried out with many different people. When the ability to communicate increases widely, it will also affect students' actions. Students will be more careful in acting by applicable rules.

So, students must start cultivating competencies to become professional teachers from now on. These competencies do not stand alone, so the improvement of one of the competencies will increase other competencies. What is needed is to continue to learn and continue to try to follow the development of science in the field of science.

Classification of Student Abilities Based on 21st Century Abilities

Figure 5 shows the group formed based on the 21st-century abilities represented by the color blue has the most members compared to the other groups, followed by the group that is the least red, and finally, the group that is green with the number in the middle. To clarify the position of each group carried out using the average values of each factor indicated in Table 3.

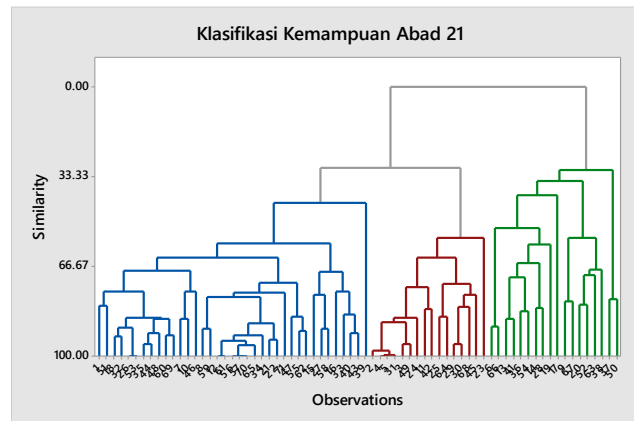


Figure 5 Classification of Students According to 21st Century Abilities

Table 3. Average Values of 21st Century Abilities Factors

Factor	G1	Total	Mean	Factor	G1	Total	Mean
X ₅ . FAC1	1	37	-0,2674	X ₇	1	37	-0,511
	2	16	-0,565		2	16	0,477
	3	18	1,052		3	18	0,628
X ₅ . FAC2	1	37	-0,339	X ₈ . FAC1	1	37	0,501
	2	16	0,961		2	16	-0,224
	3	18	-0,158		3	18	-0,831
X ₆	1	37	-0,368	X ₈ . FAC2	1	37	0,061
	2	16	-0,244		2	16	0,011
	3	18	0,974		3	18	-0,136

Source: Data Processed 2020

Based on Table 3, it is known that the first group consists of 37 students. The second group consists of 16 students. At the same time, the third group consists of 18 students. The average value in the first factor was the lowest among the other groups, the second group had the average in the middle, and the third group had the largest average. This result shows that the ability of students according to the ability of the 21st century is still relatively low, namely as many as 37 people, in the medium group as many as 16 people, and in those who are included in the high group as many as 18 people.

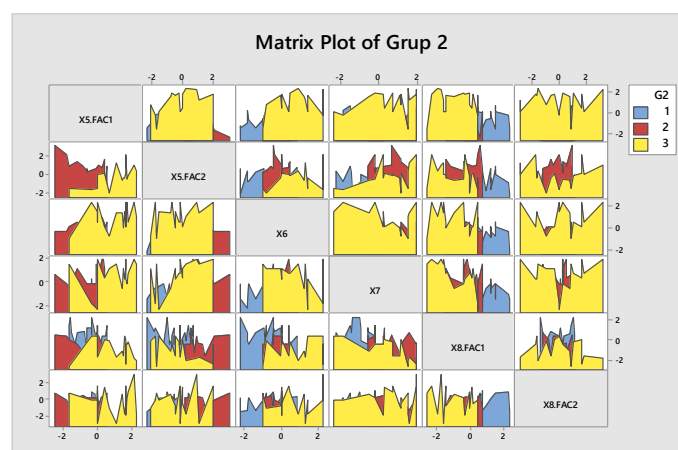


Figure 6 Matrix Plot Classification Results based on 21st Century Capabilities

The position of the distribution of data for each factor according to the group formed can be seen in Figure 6. These results support the results shown in Table 3, which show that the first group belongs to the low group, the second group is the medium group, and the third group enters the high group.

The results of the classification of 21st-century abilities are known that students are divided into three groups. In general, the classification results showed that of the 71 students sampled in this study, there were 37 students classified as having a low level of ability, 16 students in the medium group, and 18 people in the high ability category. This result gives the idea that students still do not fully master the ability to think critically, communicate, collaborate, as well creativity, and innovation.

These results show that students must begin to develop and hone their level of critical thinking, communication, collaboration, creativity, and innovation skills. The correlation results show that when you want to improve communication skills, it can be done by increasing social competence. When the ability to communicate has begun to increase, indirectly, the ability to think critically also increases. Furthermore, when students want to increase creativity and innovation, it can be done by starting to collaborate with many parties or other majors to exchange information that will eventually find new ideas and discoveries related to their field of knowledge. The results of the correlation analysis that has been carried out show that a student's abilities do not stand alone. It means that one ability will be closely related to another. Students must better recognize which ones need to be developed and become their needs when they become teachers. Then little by little began to build and familiarize myself with the ability with continuous hard work.

CONCLUSION

Based on the results of the research, it can be concluded that TBI students have begun to know technology-assisted learning media even though the types known by students are still very minimal. The types of technology in learning that many students know about are Google Classroom, Quizizz, and other interactive learning media. The results of the classification of student competency levels according to Law no. 14 of 2005 show that many research respondents still have a low level of competence. However, some students still have medium and high levels of ability. The low group consisted of 46 students, 11 people in the medium group, and 14 in the high group. Students must improve their competencies to keep up with the current development of the era. The classification of student ability levels according to 21st-century abilities shows that many respondents in this study still have low levels of ability. Hence, students need to improve their abilities to compete when they have graduated and become teachers. The number of students in the low group was 37 students, 16 students in the medium group, and 18 in the high group.

The results show the need for training or courses that are integrated with technology-assisted learning media so that students increasingly master other learning media to be able to create a fun method to support learning in the future. In addition, students also need to actively seek information or follow forums that discuss media development to keep up with the abilities of other students from different universities.

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