Proceedings
4rd UIN Imam Bonjol International Conference on Islamic Education
"Islamic Education in Era of Artificial Intelligence: Opportunities and Challenges"

IMPLEMENTATION OF 21ST CENTURY SKILLS TO IMPROVE HOTS AND LITERACY SKILLS OF STUDENTS STATE ISLAMIC UNIVERSITY IN INDONESIA

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Articel Received: 25/09/2023; **Accepted**: 10/10/2023

ABSTRACT

Some research results show that the HOT skills and literacy skills of students in Indonesia are still low. This is because students tend to learn mechanistically. Through this research, 21st century skills-based learning is implemented to improve the HOT skills and literacy skills of State Islamic University (PTKIN) students in Indonesia. This research is a summative evaluation of the development research that has been carried out previously. For the purpose of summative evaluation, a quasy experiment research was carried out with a research design Randomized Control Group Only Design, 3 (three) PTKIN in Indonesia were selected using purposive sampling technique by considering that the Elementary Statistics/Education course was taught in the 2021/2022 odd semester at the campus. The data collection methods used were observation of the learning implementation process, student respon sequestion naires, interviews and HOTS and Literacy skill tests. The collected data were analyzed with descriptive statistics and inferential statistics, namely the test. The results showed that the 21st Century Competency-Based learning process to Improve HOT Skills and Literacy of PTKIN Students in Indonesia was in theexcellent category (82.2%), student responses to the 21st Century Competency-Based learning process to Improve HOT Skills and Literacy of PTKIN Students in Indonesia were in the excellent category (81.37%). The HOTS Skill Literacy of students who learn with 21st century skills is better than the HOTS Skill and Literacy of students who learn without 21st century learning.

Keywords: 21st Century Skills, HOT Skills and Literacy Skills.

INTRODUCTION

Education in Indonesia is a unique character education in accordance with Indonesian culture, but it is very much in line with the demands of 21 st Century skills with all its challenges. The 21 st century is a century based on science and technology, thus requiring a country's human resources to master various forms of skills, including critical thinking and problem-solving skills from an increasing variety of problems. In other words, various skills within the frame work of science and technology that need to be mastered by human resources are the keywords foranation to participate in the world arena.

The 21 st century is a century that demands quality in all human end eavors and work. The 21 st century demands quality human resources, produced by professionally managed institutions that produce superior results. These all-new demands require various break throughs in thinking, conceptualization, and actions. In other words, a new paradigmis needed infacing new challenges, said philosopher Khun. According to philosopher Khun, if the new challenges are face dusing the old paradigm, then all efforts will fail. The new challenges demand a *break through thinking process* if what is desired is a quality out put that can compete with the work in an open world (Tilaar,1998).

Considering the need for 21 st century skills, qualified and professionally trained teachers are needed. Therefore, 21 st century teachers are expected to have the characteristics of adapter, visionary, collaborator, learner, communicator, model and leader. The 21 st century teacher must beable to adapt to the curriculum and the requirements needed to teach with digital tools. Teachers must be able to adapt to *hardware* and *software* to facilitate learning (Murtiyasa, 2016). The results of education in Indonesia scientifically are still below other developing countries, the ranking achieved by Indonesian students for the field of mathematics is also concerning, asshown in Table1.

Table 1. Indonesia's Ranking on TIMSS Study

Year of Study	Indonesia Ranking	Number of Participating Countries
2007	36	48
2011	38	45
2015	45	50

Source:http://nces.ed.gov/timss/

The same condition is also found in the results of the PISA study which shows that Indonesia always ranks in the bottom 10%, and almost no Indonesian students reach the two highest levels (level 5 and 6) (Stacey 2011; Fauzan, 2013; OECD,2013, 2015). This means that Indonesian students are still weak in higher order thinking (HOT). Table 2 shows Indonesia's ranking in the PISA study for the last 3(three) periods.

Table 2. Indonesia's Ranking in the PISA Study

Year of Study	Indonesia Ranking	Number of Participating Countries
2009	61	65
2012	64	65
2015	63	70

(*Source: OECD, 2015*)

Previous research that examines HOTS and Literacy skills is Wardany, Sajidan, and Ramli (2015) showing that most of the tests in high school biology books in Surakarta reflect Low Level Thinking Skills (LOTS). The results of Pratiwi and Fasha's research (2015) showed that HOTS skills only 20% formed students' discipline attitude.

This research develops Physics assessment instruments using the R&D method. The results show that the higher the student's activeness, the higher their higher order thinking skills (HOTS) will be. The effect of HOTS on discipline attitude is only below 20%.

Yuniar, Rakhmat, and Saepul rohman (2015) examined the use of HOTS *(High Order Thinking Skills)* on objective test questions in Social Studies (IPS) class V SD Negeri 7 Ciamis. This was done because there were still many questions that did not meet the criteria for making questions. There are eleven critical thinking skills that are included in the HOTS *(High Order Thinking Skills)* group, namely: 1) focusing on the question, 2) analyzing arguments, 3) considering the reliable, 4) considering observation reports, 5) comparing conclusions, 6) determining conclusions, 7) considering inductionability, 8) assessing, 9) defining concepts, 10) defining assumptions, and 11) describing. The research method use disadescriptive research method with a qualitative approach. The research to be conducted has similarities in the methods and approaches.

Lindawati, Saregar, and Yuberti's research (2016) aims to produce *Authentic Assessment* Instrument Products to measure *Higher Order Thinking Skills* (HOTS) of Class X Students in SMA/MA Physics Subjects on temperature and heat. The resulting products include: 1) cognitive dimension in the formofes says that include C4, C5, and C6; 2) psychomotor and affective dimensions in the form of observation sheets with HOTS indicators. In the fifth stage of this R&D research, product validation was carried out by eight expert lecturers and three SMA/MA educators.

Looking at learning problems as described above, schools should be the main actors in determining solutions to learning problems. Because according to Sizer (Johnson, 2011) school means a place to learn to use the mind well, think creatively to face important problems, and instill the habit of thinking. To support the learning process in schools, the right approach is needed, a learner-oriented approach where learners learn interactively and have the opportunity to communicate and argue.

One of the efforts in over coming these problem sisthrough learning by lecturers inside and outside the classroom. In order for lecturers to understand how to implement 21 st Century skills in learning, researchers implemented the development of 21 st century skills learning in higher education with the aim of research to find out:

1. Implementation of 21 st Century Skills-Based Learning Process to Improve HOTS and Literacy Skills of PTKIN Students in Indonesia,
2. Student responses to the 21 st Century Skills-Based learning process to improve HOTS and Literacy Skills of PTKIN Students in Indonesia
3. HOT skills and literacy skills of students taught with 21 st century skills learning are better than HOT skills and literacy skills of students taugh twithout 21 st century skills.

MATERIALS AND METHODS

This research is a summative evaluation of the development research that has been done before. For the purpose of *summative evaluation, aquasy experiment* research was carried out with the research design *Randomized Control Group Only Design,* 3 (three) PTKIN in Indonesia were selected using *purposive sampling* technique by considering that the Elementary Statistics / Education course was taught in the 2021/2022 odd semester at the campus. In accordance with this research design, in each PTKIN / campus that was sampled, the research used two classes, namely experimental and control classes. The experimental class is a class that is deliberately given treatment, namely applying 21 st century skills-based learning, while the control class does not apply learning using 21 st Century Skills-Based Learning commonly used by lecturers. The research design used is *Randomized Group Only Design. The* research design can be described in Table 3 below:

Table 3. *Statistical* Research *Design Group Design*

Class	Treatment	Test
Experiment	*X1*	T
Control	X2	T

Source: Seniati (2011:125)

Description:

X1 is Learning using 21 st Century Skills learning, X2 is Learning using Conventional learning, and T is HOTS and Literacy proficiency test.

The population of this study is all PTKIN students in Indonesia. Currently, there are 58 PTKIN consisting of 23 UIN, 30 IAIN, and 5 STAIN. The sample of this research is three PTKIN in Indonesia using *purposive sampling* technique, namely UIN Imam Bonjol Padang, IAIN Manado and UIN Sutan Kasim Riau. The instruments used in this study are observation sheets of learning implementation, student response question nairesto 21st century skills-based learning, interview sheets and HOTS and Literacy ability test questions for students. Before this instrument is used in research, it is first validated by experts in the field of statistics and education and has been proven valid and reliable.

RESULTS & DISCUSSION

Based on the results of research on three PTKIN campuses in Indonesia involving 3 lecturers teaching elementary statistics/education courses and 3 observers who were tasked with observing the implementation process, the following data were obtained:

1. Observation Result of Learning Process Based on 21 st Century Skills

Observation was carried out during the implementation of learning by an observer to find out that the lecturer carried out learning activities in accordance with the criteria of 21 st century skills to improve *students' Hots* and *Literacy Skills.* For 21 st century skills, in the learning steps the lecturer shows the process of asking student stop resent the results of the discussion, summarizing the learning material, the lecturer

asks students to work together with the group in solving a problem, providing activities related to real activities in groups, linking the material to be learned with the previous material, providing opportunities for students to learn the material to be learned with the previous material. in groups, linking the materialto be learned with previous material, providing opportunities for students to solve problems with their own ideas and seek information independently. Lecturers alsohone students' HOT skills by guiding students to analyze, evaluate and create. *Literacy* skills by guiding students in complex problem solving, multi disciplinary, in open problems, literacy incommunication and collaboration, *literacy* increativity and entrepreneurial thinking and *literacy* in utilizing innovative knowledge, information and opportunities. At the end of the lesson, the lecturer concludes and reflects on the learning with students regarding the day's learning activities.

The 21 st Century Skills-Based Learning Process that has been implemented for 6 meetings for 4 chapters of the Elementary Statistics Book/21 st centurys kills-based education at 3 PTKIN in Indonesia is well and very well implemented. So it can be concluded that lecturers at the 3 PTKIN have implemented 21 st century skills-based learning verywell (82.5%), as shownin the following table and histogram:

Table 4. Observation Results of 21 st Century Learning

No.	Assessment Aspect	Score (%)	Category
A	**Competence 21st Century**		
1	Communication	84%	Verygood
2	Collaboration.	82%	Verygood
3	Critical Thinking and Problem Solving	84%	Verygood
4	Creativity and Innovation	80%	Good
	Average	**82,5%**	**Very good**
B	**HOT Skill**		
1	Analyzing	82%	Very good
2	Evaluation	84%	Very good
3	Create	82%	Very good
	Average	**82,67%**	**Very good**
C	**Literacy Skill**		
1	Literacy in Complex problem solving, multi disciplinary, open-ended problems	82%	Very good
2	Literacy in communication and collaboration	84%	Very good
3	Literacy in Creativity and entrepreneurial thinking	82%	Very good
4	Literacy in utilizing innovative knowledge, information and opportunities	82%	Very good
	Average	**82,5%**	**Verygood**

Based on table 4 above, the average score of lecturers' implementation inapplying 21st century skills is 82.5%, which is in the Very Good criteria, and guiding students in HOT skills is 82.67%, which is in the Very Good criteria and Literacy skills is 82.5%, which is in the Very Good criteria. This shows that the lecturer has implemented 21st century skills-based learning very well, as shown in The following histogram:

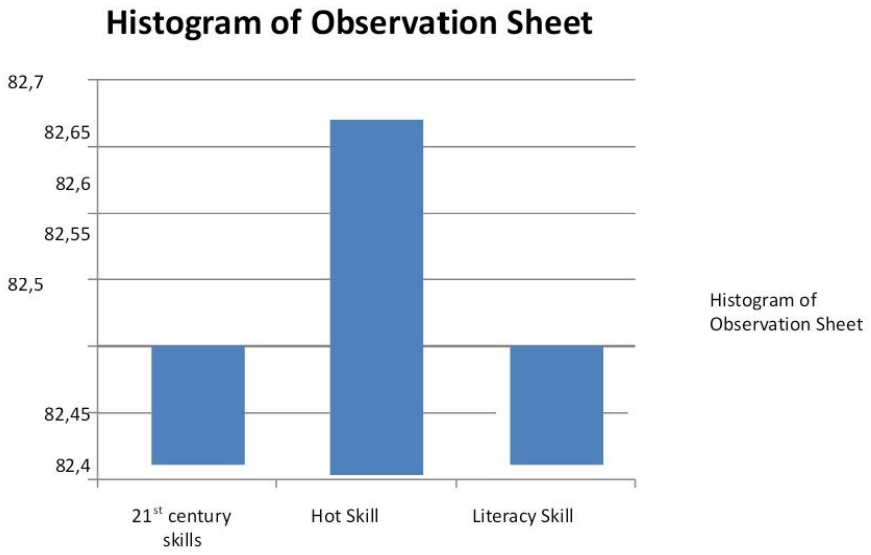

Figure 1. Histogram of observation sheet

2. Results of Student Response Questionnaires on the 21 st Century Skills-Based Learning Process

Student response questionnaires in the implementation of the 21 st century skills-based learning process were givenat the end of the research implementation, namely the sixth and or seventh week in the experimental class. The questionnaire asked for student responses related to learning activities in accordance with the criteria for skills in the 21 st century to improve students' Hots and Literacy Skills. Students are asked to assess/respond about the lecturer's learning steps whether they show the process of asking student stop resent the results of the discussion, summarize the learning material, lecturers ask students to work together with groups in solving a problem, provide activities related to real activities in groups, link the material to be learned with previous material, provide opportunities for students to solve problems with their own ideas and search for information independently. Students are also honed in their HOT skills by guiding students to analyze, evaluate and create. *Literacy* skills by guiding students in complex problem solving, multi disciplinary, in open problems, literacy in communication and collaboration, *literacy* increativity and entrepreneurial thinking and *literacy* in utilizing innovative knowledge, information and opportunities. At the end of the lesson, the lecturer concludes and reflects on the learning with students regarding the day's learning activities.

Table 5. Results of 21 st Century Learning Student Response

No.	Assessment Aspect	Score (%)	Category
A	**Competence21 st Century**		
1	Communication	80%	Good
2	Collaboration.	83%	Very good
3	Critical Thinking and Problem Solving	80,33%	Good
4	Creativity and Innovation	83%	Very good
	Average	**81,58%**	**Very good**
B	**HOT Skill**		
1	Analyzing	81,67%	Very good
2	Evaluation	82,67%	Very good
3	Create	81%	Very good
	Average	**81,78%**	**Very good**
C	**Literacy Skill**		
1	Literacy in Complex problem solving, multidisciplinary, open-ended problems	80,17%	Good
2	Literacy in communication and collaboration	80,67%	Good
3	Literacy in Creativity and entrepreneurial thinking	79,33%	Good
4	Literacy in utilizing innovative knowledge, information and opportunities	81%	Very good
	Average	**80,3%**	**Good**

Student responses in the implementation of the 21 st century skills-based learning process were given at the end of the research implementation, namely the sixth week in experimental classes at 3 PTKIN in Indonesia with the average results being very good. The average score of student responses in applying 21 st century skills is 81.58%, which is in the Very Good criteria, and student responses tolecturers who guide students in HOT skills are 81.78%, which is in the Very Good criteria and Literacy skills 80.3%, which is in the Very Good criteria. So it can be concluded that lecturers at the 3 PTKIN have implemented 21 st century skills-based learning very well, an average of 81.22% as shown in the following histogram:

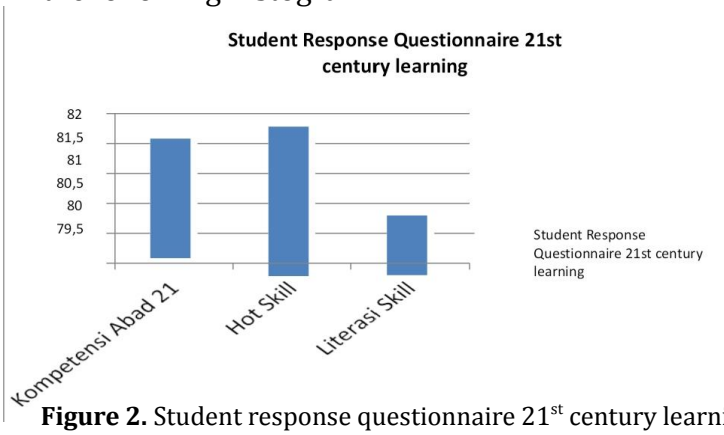

Figure 2. Student response questionnaire 21st century learning

3. HOT Skill and Literacy Skill Test Results HOT Skill and Literacy Skill Test Results Hypothesis Testing

The hypothesis to be proven is that the HOT skills and literacy skills of students taught with 21 st century skills learning are better than the HOT skills and literacy skills of students taught with learning without the application of 21 st century learning.

Table 6: Results of Data Analysis on HOT and Literacy Skill Abilities

Class	N	Min	Max	$\bar{x}$
Experiment	74	5	32	24,35
Control	77	0	31	17,47

Based on the results of the study, it is known that the average value range of the experimental class consisting of 74 people is 28.35 higher than the average value of the control class consisting of 77 people which is 17,47. The maximum value of the experimental class is 32, while the minimum value of the experimental class which is 5 is greater than the control class which, meaning that the range of values of the two classes is different.

Table 7. Tests of Normality

Class		Kolmogorov-Smirnova[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
HOT skill	Experiment Class	0.224	74	0	0.883	74	0
	Control Class	0.181	77	0	0.916	77	0

a.Lilliefors Significance Correction

From table 7, it is known that the data is normally distributed because the significance is greater than alfha 0.05, then proceed with the homogeneity test.

Table 8. Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
20.394	1	149	0

From table 8, it is known that the data is not homogeneously distributed because the significance value is less than 0.05 so that the hypothesis test carried out is a test that requires the assumption of normally distributed and in homogeneous data, namely the Mann withney Unon-parametric test. This test was carried out with SPSS, obtained the following data:

Table 9. Non-parametric Mann Withney U Test

Statistics[a]

	HOTskill
Mann-Whitney U	1744.5
Wilcoxon W	4747.5
Z	-4.133
Asymp.Sig.(2-tailed)	0

a Grouping Variable:Class

Sig value or P Value of 0.000 <0.05.If the p value <0.05 critical limit then Ha is accepted.This means that there is a significant difference between the two groups. That is, the HOT and Literacy Skill abilities of students who learn with 21 st century learning are better than students who do not apply 21 st century learning.

CONCLUSION

The 21 st Century Skills-Based Learning Process that has been carried out for 6 meetings for 4 Chapters of Elementary Statistics / Education based on 21st century skills at 3 PTKIN in Indonesia is very well implemented. Student responses in the implementation of the 21st century skills-based learning process were given at the end of the research implementation, namely the sixth week in experimental classes at 3 PTKIN in Indonesia with an average result of Very Good. Based on the results of the HOT Skill and Literacy Skill tests that have been carried out, then hypothesis testing is carried out, it is found that the HOTS and Literacy Skill abilities of students who learn with 21 st century learning are better than the abilities of students who do not apply 21 st century learning.

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