JURNAL PENDIDIKAN INDONESIA
https://jurnal.seaninstitute.or.id/index.php/jupei

JU-PENDI
ISSN : 2963-2412
VOL 02. No. 01, 2023

The Influence of Intellectual Intelligence on the Learning Outcomes of Prospective Physics Teachers

[1]Ayu Lestari, [2]Jihan Alya Revalina, [3]Bayu Setiaji
[1,2,3] Physics Education Study Program, Faculty of Mathematics and Natural Sciences, Yogyakarta State University.

ARTICLE INFO

Keywords:
intellectual intelligence,
prospective physics teacher

ABSTRACT

IQ is an intelligence related to awareness of space, awareness of what is visible and mastery of mathematics. This research aims to (1) describe the intellectual intelligence of prospective physics education teachers for classes A and C. (2) describe the physics learning outcomes and describe the physics learning outcomes of prospective physics education teachers, and (3) determine the relationship between intellectual intelligence and physics learning outcomes . By knowing the level of readiness of prospective physics education teacher students. The method used is a survey with the type of research being quasi-experimental. Student readiness for prospective physics education teachers is measured using a student readiness questionnaire. This questionnaire has 10 statements with 4 choices. This research involved physics education class A and physics education class C.

Email:
ayu2431fmipa.2023@student.uny.ac.id

INTRODUCTION

Intelligence is always identified with Intellectual Intelligence or what is commonly known as IQ (Intelligence Quotient). IQ is an intelligence related to awareness of space, awareness of what is visible and mastery of mathematics. With this intelligence, humans are able to calculate, learn algebra, operate computers, learn foreign languages, understand physics formulas and carry out even complex calculations. Intellectual intelligence is an individual's ability to face the demands of life, and is related to skills in thinking on a normal scale and ratios. Based on the description above, it can be concluded that intellectual intelligence is a person's ability to do everything systematically by looking at conditions as a whole.

Someone who is able to balance these three intelligences will be able to achieve high achievements. In relation to the achievement of physics mastery learning, the indicator of emotional intelligence, namely the ability to motivate, will provide encouragement to always achieve, have commitment, initiative and optimism. Social skills give students the ability to build communication with various parties. Students who have this ability will always collaborate with their colleagues to solve the physics problems given and will not hesitate to ask the teacher when there is a problem that they cannot solve alone. Thus, the ability to motivate and social skills will have a positive influence on students' physics learning outcomes. Intellectual intelligence in relation to physics learning will have an influence on the way students express reasoning that has been arranged in their minds which contains systematic combinations of words according to what they are facing. so that the way he explains his opinion helps other students to better understand the direction of physics learning. Spiritual intelligence in relation to learning physics will give a feeling of happiness and joy when studying physics because a student who has high spiritual intelligence can find the positive meaning contained in physics.

This study aims to determine(1) describe the intellectual intelligence of prospective physics education teachers for classes A and C. (2) describe the physics learning outcomes and describe the

physics learning outcomes of prospective physics education teachers, and (3) determine the relationship between intellectual intelligence and physics learning outcomes

METHOD

This type of research is quasi-experimental, where the researcher does not have the power to choose research subjects randomly, but uses groups consisting of treatment (experimental) groups. The research design used was non-equivalent groups. The purpose of using this design is to determine the effect of the multi-representation learning approach on physics learning outcomes, the influence of prospective teachers' learning motivation on physics learning outcomes, and the interaction between the multi-representation learning approach and students' learning motivation on physics learning outcomes.

This research was conducted at Yogyakarta State University. The sample was selected by purposive sampling. The research sample consisted of two classes, namely Physics A class and Physics C class. The initial stage of this research was to give a pre-test to prospective teachers in the control class and experimental class to determine the initial abilities of the prospective teachers. The questions are in the form of a questionnaire with 10 statements.

This research aims to determine the influence of the multi-representation learning approach on physics learning outcomes, the influence of prospective teachers' learning motivation on physics learning outcomes, and the interaction between the multi-representational learning approach and prospective teachers' learning motivation on physics learning outcomes. The data obtained in this research are the results of learning in the cognitive domain and learning motivation of prospective teachers.

Table 1. questionnaire statement

No	Indicator
1	I enjoy studying physics because I know its uses in everyday life
2	Physics subject matter feels very difficult for me
3	I feel like I'm at a loss if I skip class or don't pay attention when the lecturer explains physics material because I don't know the purpose of studying physics
4	I feel that the physics assignments given by the lecturer can be completed easily and according to my abilities
5	I like to explain physics material or topics that the lecturer has explained to my friends
6	If you master physics you can easily master other fields of study
7	I felt confident that by studying physics I could become a teacher
8	There are many new and exciting things that I have never or rarely experienced in other courses I have taken
9	I will always try to get good grades on every test and assignment given
10	I have complete physics lesson notes

Information:

SS : Strongly agree
S : Agree
T.S : Don't agree
STS : Strongly Disagree

Data analysis techniques in the testThe relationship between intellectual intelligence and physics learning outcomes for prospective physics teachers is carried out by collecting and analyzing data obtained from distributing questionnaires to prospective physics teachers at Yogyakarta State

JU-PENDI
ISSN : 2963-2412
VOL 02. No. 01, 2023

University using the sum of each respondent's results, then finding the percentage, using the percentage formula, namely:

$P = \frac{f}{N} \; x \; 100\%$

Information :

P = Mean response
F = Number of indicator responses
N = Number of Samples

Table 2. Eligibility criteria for aspiring physics teachers

Score Range	Assessment Category
75% - 100%	Very good
50% - 75%	Good
25% - 50%	Not good
0% - 25%	Very Not Good

The next data testing technique uses a one sample t-test

RESULTS AND DISCUSSION

After distributing questionnaires to prospective physics teacher A and prospective physics teacher C, taking 52 respondents and each class taking 26 respondents. The data analysis technique is carried out by collecting the number of respondents for each indicator.

Table 3. Recapitulation of prospective physics teacher respondents

Likert Scale	Indicator										Amount
	1	2	3	4	5	6	7	8	9	10	
S	37	23	25	19	39	35	29	35	25	30	296
SS	10	11	24	3	6	9	9	13	26	6	117
T.S	3	16	3	21	8	8	13	3	1	11	87
STS	2	2	0	9	0	0	1	1	0	5	20
AMOUNT											**520**

Table 4. Eligibility criteria for aspiring physics teachers

Score Range	Assessment Category
75%9 - 100%	Very good
50% - 75%	Good
25% - 50%	Not good
0% - 25%	Very Not Good

In the questionnaire on the influence of intellectual intelligence on the learning outcomes of prospective physics teachers, respondents filled in each indicator item 1 to 10. With a summary of the research results as in table 4

Table 5. Questionnaire Analysis Results

Likert Scale	Indicator										Amount	Criteria
	1	2	3	4	5	6	7	8	9	10		

S	20%	23 .3%	43.3%	-	13.3%	16.7%	18.3%	26.7%	51.7%	11.7%	225%
SS	71.7%	43.3%	50%	41.7%	70%	66.7%	56.7%	66.7%	46.7%	60%	573.5%
T.S	-	30%	-	36.7%	13.3%	16.7%	23.3%	-	-	20%	140%
STS	-	-	-	15%	-	-	-	-	-	8.3%	23.3%
AVERAGE											**96.18% Very good**

Based on the results of the questionnaire analysis by 52 prospective physics teachers at the Faculty of Mathematics and Natural Sciences (FMIPA) Yogyakarta State University, it is presented in table 4. The results of the Influence of Intellectual Intelligence on the Learning Outcomes of Prospective Physics Teachers produced an average final score of 96.18%, the results Based on the eligibility criteria, it is included in the very good category.

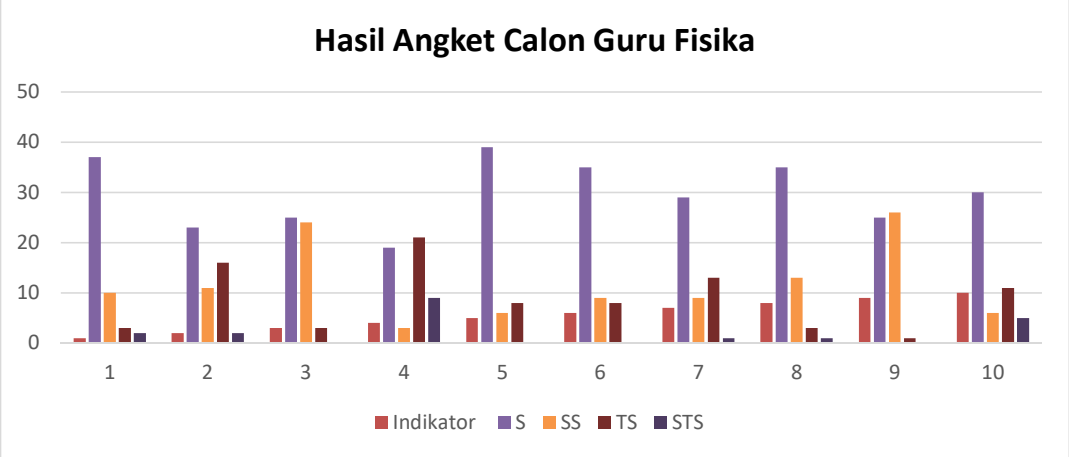


Figure 1. Bar diagram of data test results from questionnaire results for prospective physics teachers

In Figure 1. A bar diagram is presented, the research results show that each respondent stated that there wasThe relationship between intellectual intelligence and physics learning outcomes for prospective physics teachers in classes A and C. From the results of the analysisobtained an average score of 96.18% and was included in the very good category. So it can be concluded that intellectual intelligence influences the preparation of prospective physics teachers, because people with good intellectual intelligence tend to have strong memories. Therefore, from this research it is clear that all respondents agree with these indicators. This shows that prospective physics teachers at Yogyakata State University are ready to become teachers.

One Sample T-Test

Table 6. One Sample T-Test

	One Sample T-Test					
	t	**df**	**p**	**Mean Difference**	**Cohen's d**	**SE Cohen's d**
S	14,360	9	< .001	29,600	4,541	1,064
SS	4,886	9	< .001	11,700	1,545	0.468
T.S	4,200	9	0.002	8,700	1,328	0.434
STS	2,176	9	0.058	2,000	0.688	0.352

The results obtained above show the test results of the average difference between the average value and the standard value. The test results found that the t value on the "S" indicator was 14,360

with p <. 001. The "SS" indicator at the t value is 4.886 with p <.001. The "TS" indicator has a t value of 4.200 with p 0.002. The "STS" indicator has a t value of 2.176 with p 0.058. Because the p value <0.05 then Ho there is a difference between the average and the standard value.

Assumption Checks

Table 7. Test of Normality (Shapiro-Wilk)

Test of Normality (Shapiro-Wilk)		
	W	**P**
S	0.936	0.508
SS	0.847	0.053
T.S	0.923	0.382
STS	0.737	0.002

Based on the tests that have been carried out, the P value obtained for the "S" indicator is 0.508, for the "SS" indicator it is 0.053, and the "TS" indicator is 0.382. From these results it is known that the p value is > 0.05 so that the variance of the three indicators is homogeneous. Based on the tests that have been carried out, the P value obtained for the "STS" indicator is 0.002, therefore p < 0.05, so from the results of this analysis it can be concluded that each indicator has different respondent results.

Table 8. Descriptives

	N	**Mean**	**elementary school**	**S.E**	**Coefficient of variation**
S	10	29,600	6,518	2,061	0.220
SS	10	11,700	7,573	2,395	0.647
T.S	10	8,700	6,550	2,071	0.753
STS	10	2,000	2,906	0.919	1,453

Table 9. Normality Test

Descriptive Statistics				
	S	**SS**	**T.S**	**STS**
Valid	10	10	10	10
Missing	0	0	0	0
Mode	34,806[a]	9,152[a]	4,639	0.415[a]
Median	29,500	9,500	8,000	1,000
Mean	29,600	11,700	8,700	2,000
Std. Deviation	6,518	7,573	6,550	2,906
Minimum	19,000	3,000	1,000	0,000
Maximum	38,000	26,000	21,000	9,000

The results of the normality test are displayed in the output above. In conclusion, the data is said to be normal if the p value is > the selected significance level. The data obtained concluded that the 4 indicators had a normal distribution.

Table 10. Descriptive Statistics

Descriptive Statistics				
	S	**SS**	**T.S**	**STS**
Valid	10	10	10	10

JU-PENDI
ISSN : 2963-2412
VOL 02. No. 01, 2023

Missing	0	0	0	0
Mean	29,600	11,700	8,700	2,000
Std. Deviation	6,518	7,573	6,550	2,906
Minimum	19,000	3,000	1,000	0,000
Maximum	38,000	26,000	21,000	9,000

The data is used to create graphs.

QQ Plots

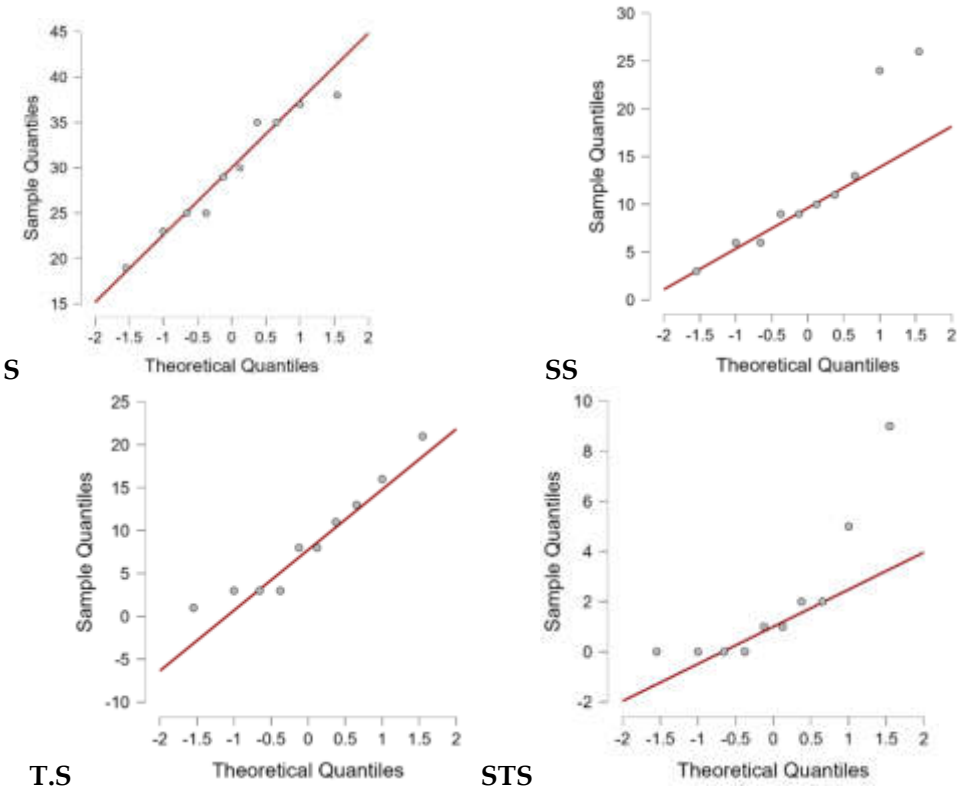
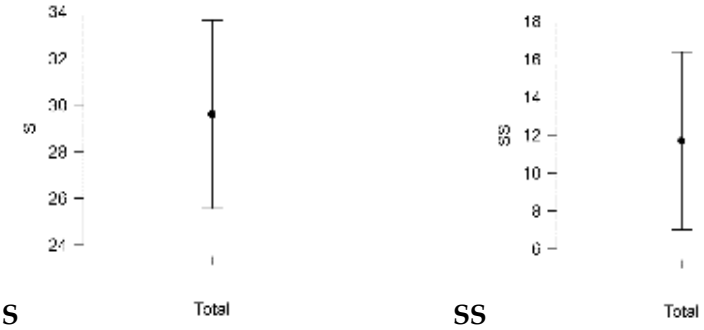
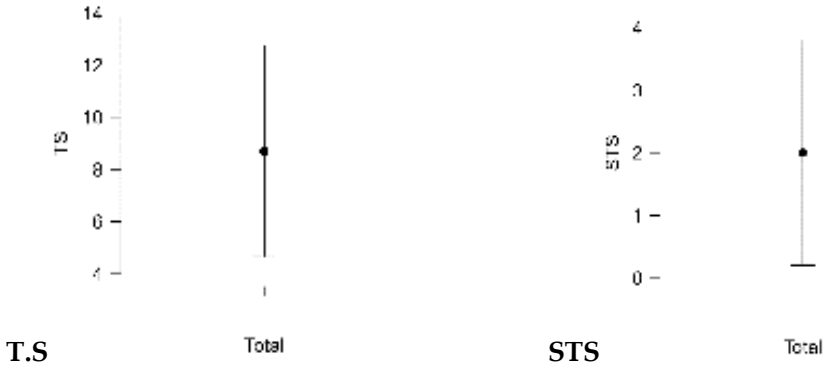


Figure 2. QQ Plots

Interval plots





T.S **STS**

Figure 3. Interval plots

This graph was created using the one sample T-Test. If the p-value is greater than or equal to the selected significance level, it is said to be normal. I use descriptive statistics and look for graphs to see more accurate data. If the graphs are parallel then the data is said to be normal.

CONCLUSION

Based on the results of this research, the results of research on the intellectual level of prospective physics teachers for class A and C students at Yogyakarta State University gave very good results and we can conclude that these students are ready to become physics teachers. This can be seen from the results of the questionnaire distributed, where each indicator showed the most positive responses.

REFERENCES

Nuraini, Fitri. "Emotional intelligence, intellectual intelligence and spiritual intelligence towards understanding basic accounting with motivation as a moderating variable." Journal of Accounting Science 1.2 (2017): 93-118.

Almia, KORNIATI "Analysis of Inequality Factors in the Contribution of Intellectual Intelligence (IQ) to the Learning Achievement of Physics Education Students Class of 2016 at UIN Alauddin Makassar." (2019)

Kustijono, Rudy. "Implementation of student centered learning in basic physics practicum." Journal of Physics Research and Applications (JPFA) 1.2 (2011): 19-32.

Solikh, Miftah Nur, Dwi Sulisworo, and Guntur Maruto. "The influence of the blended learning model assisted by Google Classroom on critical thinking skills in terms of self-esteem and intellectual intelligence." Journal of Physics Materials and Learning 8.2 (2018): 27-32.

Nuraini, Fitri. "Emotional intelligence, intellectual intelligence and spiritual intelligence towards understanding basic accounting with motivation as a moderating variable." Journal of Accounting Science 1.2 (2017): 93-118.

Husni, Hiqmatiar, Kamaluddin Kamaluddin, and Amiruddin Kade. "The Relationship between Multiple Intelligences and Physics Learning Outcomes for Class VII State Middle School Students in Palu City." JPFT (Journal of Tadulako Online Physics Education) 1.3 (2014): 18-22.

Putra, Riki Purnama, et al. "The Influence of Emotional Intelligence on Digital Literacy in Physics Virtual Practicum from Students' Gender Perspective." WaPFi (Physics Education Forum) 7.1 (2022): 46-51.

RESKYKA PUTRI ABMI, AYU "The RELATIONSHIP OF EMOTIONAL INTELLIGENCE TO THE PHYSICS LEARNING OUTCOMES OF CLASS X MIA STUDENTS OF STATE HIGH SCHOOLS IN JAMBI CITY." THE RELATIONSHIP OF EMOTIONAL INTELLIGENCE TO

PHYSICS LEARNING OUTCOMES OF CLASS X MIA STATE HIGH SCHOOL STUDENTS IN JAMBI CITY.

Syaifudin, Moch. "The Influence of Emotional Intelligence, Spiritual Intelligence, and Intellectual Intelligence on the Level of Accounting Understanding (Empirical Study of Unisma Accounting Study Program Students)." (2021).

Hidayatullaily, Salwa, et al. "The Influence of Emotional Intelligence and Learning Achievement on the Mathematical Disposition of Prospective Mathematics Teacher Students." Scientific Journal of Realistic Mathematics 4.1 (2023): 112-119.

Susilawati, Princess. The influence of emotional intelligence in improving affective and cognitive abilities in Physics Science subjects at SMK 5 Pagesangan Mataram. Diss. UIN Mataram, 2021.

Handriyani's grandmother, Muhammad Subhan. 2020. The Relationship between Intellectual Intelligence and Spiritual Intelligence on Physics Learning Achievement: Journal

A. Doyan, M. Taufik, R. Anjani. 2018. The Effect of Multi-Representational Income on Physics Learning Outcomes in View of Students' Learning Motivation: Journal

Ismet. 2013. The Impact of Multiple Representation-Based Mechanics Lectures on the Spatial Intelligence of Prospective Teacher Students: Journal

Laras Widyaningtiyas. 2015. The Influence of the Multi-Representation Approach in Physics Learning on the Cognitive Abilities of High School Students: Journal

Yuvita Widi Astuti. 2014. High School Physics Teaching Materials with a Multi-Representation Approach: Journal

Syukiyah Agustini, Nyoman Trisna Herawati. 2013. The Influence of Intellectual Intelligence, Emotional Intelligence, and Spiritual Intelligence on Students' Ethical Attitudes: Journal

Almia, K. (2019) Analysis of Inequality Factors in the Contribution of Intellectual Intelligence (IQ) TO THE Learning Achievement of Physics Education Students Class of 2016, State Islamic University (UIN) Alauddin Makassar, UIN Alauddin Makassar Repository.

Sari, PE, Koto, I. and Sakti, I. (2019) The Relationship between Intellectual Intelligence and Physics Learning Outcomes for Class XI Science High School Students, Jurnal Kumparan Physics.

Wulandari, Novita, Esa Hidayatul Adha, and Bayu Setiaji. "Development of Augmented Reality Based Learning Media on Geometric Optics Material." Indonesian Journal of Physics Research and Learning 4.1 (2022).

Kusumawati, Andhiani Eka, Wulan Anggraini, and Bayu Setiaji. "Analysis of Prospective Physics Teacher's Misconceptions on Interference Material using Certainty of Response Index (CRI)." Journal of Physics and Technology Education 8.1 (2022): 116-126.

Setiaji, Bayu, and Pri Ariadi Cahya Dinata. "Analysis of the readiness of students majoring in physics education to use e-learning in the Covid-19 pandemic situation." Journal of Science Education Innovation 6.1 (2020): 59-70.

Febriansyah, Erwin, Fraternesi Fraternesi, and Anina Safitri. "THE INFLUENCE OF INTELLECTUAL INTELLIGENCE, EMOTIONAL INTELLIGENCE, AND SPIRITUAL INTELLIGENCE ON UNDERSTANDING INTRODUCTION TO ACCOUNTING COURSES." ECOMBIS REVIEW: Scientific Journal of Economics and Business 8.2 (2020): 160-170.