

Investigating the Relationship between Students' Interest and Intrinsic Motivation with Curiosity in Learning Science

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Keywords: Students' Interest, Intrinsic motivation, curiosity in Learning Science.

Abstract: This study isto investigate: (1) initial student's interest, intrinsic motivation, and curiosity in learning science, (2) to the relationship between student's interest and curiosity in Learning Science, (3) the relationship between intrinsic motivation and curiosity in Learning Science, (4) the relationship between student's interest and intrinsic motivation with curiosity in Learning Science. The subject in this study is students of seventh- grade Integrated Islamic Junior High School Medan. The path analysis was applied to conceive the liaison between student's interest, intrinsic motivation, and curiosity in Learning Science. The findings were indicated that the most of the initial students' level of interest, intrinsic motivation, and curiosity in learning science positively in very high and high level. The relationship between interest, intrinsic motivation with curiosity toward science was acquired multiple R is 0,992.It shows a very strong level of relationship between students' interest, intrinsic motivation, and curiosity. The linearity relationship between interest, intrinsic motivation and curiosity is the students' curiosity towards science lessons increased due to increased interest and intrinsic motivation. In the significance *F*column in the ANOVA table, *F*-value <0,05 or *p*-value> *t*-Statistic means interest is very influential on curiosity.

1 INTRODUCTION

Every person has an interest in something different in his or her type of interest and level (Silvia, 2006).Interests are defined as one's attraction to something that makes them more heedful and spry. (Krapp, Hidi, &Renninger, 1992).Interests are not merely positive emotions or momentary interest, interest includes stored knowledge, stored values, and feelings that affect direct involvement in scientific tasks (Ainley, et al, 2005). Interest in something arises because there is a positive interaction between the individual and the object (Krapp,2005; Schiefele, 1991). Individual interests cover curiosity, surprise, and interest, all of which are seen in action or behaviour (Silvia, 2006).

The students' impressions of fun things about science have an impact on the growth of students' interest in science lessons (Bulunuzz& Jarrett, 2010).

Based on the investigation was carried out by Tai and colleagues at US high school students found students who had an interest in science career in grade 8three times more likely to get a bachelor's

degree in science than those who do not show interest(Tai et al, 2006). In another study approximately 65% of scientists with a high academic title in science field interviewed said that an interest in science had been begun before junior high school was due to the interaction with interesting science lessons (Maltese & Tai, 2010).Therefore the memorable experience of science must be created with the active and interactive learning environment along with the interesting learning materials so that interest can survive in students into individual interest (Krapp, 2004).

In many literature, it was stated that motivation was one of the key elemens for students' success doing difficult tasks in learning and working (Jovanovic &Matejevic, 2014). One of motivation is intrinsic motivation which originates from a personal inclination effects encouragement to achieve the goal (Ryan & Deci, 2000). Intrinsic motivationstimulates curiosity and tries to find the answer of the problems (Renninger, 2007).

Curiosity is one of the goals of learning achievement derived from the work of cognition in

the affective domain and be in charge of stimulating the desire to learn continuously and independently. (Stumm, et,al, 2011; Sinha, et,al, 2017).The curiosity that grows and develops in the student's feelings will give rise to actions that encourage an individual to engage in the activities of finding something through independent information searching, conducting voluntary investigation activities for expecting a memorable experience while doing so(White, 2009; Baumgarten, 2001).

In Engel's book (2105), Daniele Beryle is the first researcher that learns the human's curiosity experimentally. He said that the curiosity is thought of as an impulse like an appetite where hunger triggers us to seek food. When curiosity wraps our feelings, we try to satisfy feeling by seeking information. So, curiosity can be an expression in words and behaviours and encouragement to know more information.

Schmitt & Lahroodi (2008), argues that curiosity is the desire of self-motivation to know something that arises and attracts one's attention to the object and in turn focuses one's attention to it. However, curiosity does not automatically develop into well-developed individual interests and the degree of engagement that leads to the desired outcomes of greater learning and mastery. (Arnone, et, al, 2011).

2 METHODS

2.1 Procedure

The research method that used in this study was survey of correlation. Data collection technique was conducted by employing a set of questionnaires and interview to students. The interview was carried out representation from each level. As for its questionnaire type consist of : interest, intrinsic motivation, and curiosity in learning science.

The questionnaire indicators of interest in learning science was adapted from hard skills and soft skills by Hendriana, et, al, (2017). The following its indicators : 1) Pleasure feeling, 2) Students' attention, 3) Students' involvement, 4) Diligent in doing the task, 5) Diligent and discipline in learning. The indicators of questions for intrinsic motivation were adapted from Schunk et, al,(2008) : 1) The firmness of purpose (to make effort doing the work seriously), 2) Student's belief in self-ability (students' competence), 3) Feelings of pride in the execution of a good task, 5) High expectations on the success of the task performed, 6) Fully engagement in learning process.

The questionnaire indicators of curiosity in learning science was adapted from Binson, (2009).The following its indicators : 1) The desire to seek new information, 2) Asking questions related to the subject matter, 3) The desire to apply knowledge to find a new concept (inquiry), 4) Active in solving problems in science lessons. (Searching for answers to the knowledge learned).

Interviews were done to teachers and students to ask the science learning process that had been done by teachers and had felt by the students. Instruments were designed according to indicators and validated by testing the validity of test contents through expert judgment (Azwar, 2016).

The obtained student's responses on the questionnaires were scored according to scoring criteria. The means on each variable interest, intrinsic motivation, and curiosity in learning science were counted by computer. The next step for analyzing data was to calculate standard deviation.

To identify initial students' characteristic related to interest, intrinsic motivation, and curiosity in learning science, descriptive statistic analysis was used. The questionnaires of three instruments were categorized based on the following level :

Tabel 1: The score interpretation level of each students' characteristic.

Score	Level
100 – 81	Very High
80 – 61	High
60 - 41	Medium
40 – 21	Low
20 - 0	Very low

Data analysis adopted to understand the relationship between student interest, intrinsic motivation, and curiosity in learning science was calculated through the correlation coefficient of product moment. The significance level used was 0.05.

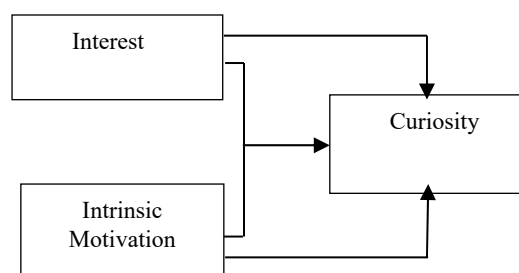


Figure 1: Design of research method.

2.2 Population and Sample

The population of this research data comes from Islamic high school students integrated in Medan. Samples were acquired based on Purposive Sampling technic based on criteria that had been established by researchers, namely: high schools that apply the concept of integrated Islamic schools. An integrated Islamic school is a school that is based on the Islamic values of the Qur'an and *As Sunnah* that combines general and religious lessons. There were three schools participating in this study where the number of students in each school as follows: The first school were 50 students. The second school were 115 students. The third school were 86 students. Total students who had participated in this study were 251 students.

3 RESULT AND DISCUSSION

3.1 Result

Based on the results of investigations on the character of students in the three schools are as follows: Students are from middle to upper class, religious atmosphere, friendly, and communicative, students easily regulated. From data analysis identification of students' characteristic related to interest, intrinsic motivation, and curiosity were acquired as follow :

1. The initial level of students' interest in Learning Science

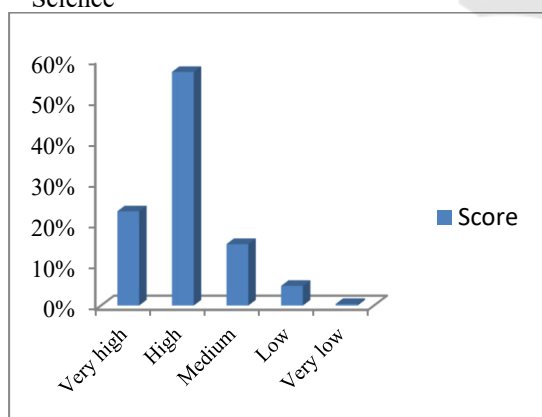


Figure 2: The criteria of students' interest in Learning Science.

Figure 2 above elaborates the percentage of students' interest level in science lessons. Students who had a very high interest in science lessons were 23% as many as 58 students. There were 143

students on high- interest level 57% highest on this criteria. There were 37 as many as 15% students on level medium. There were 12 students as many as 4.8% in in the low level of interest. There was only 1 student, namely 0.4% on the lowest level of interest.

2. The initial level of students' intrinsic motivation in Learning Science

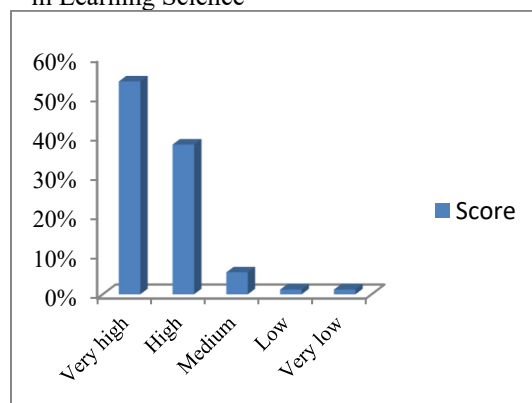


Figure 3: The criteria of students' intrinsic motivation in Learning Science.

Figure 3 above elaborates the percentage of students' intrinsic motivation level in science lessons. Students who had a very high intrinsic motivation in science lessons were 54% as many as 135 students. There were 96 students as many as 38% on the high level of intrinsic motivation. For the medium level of intrinsic motivation were 6% as many as 14 people. There were 3 students as many as 1.2% on the low level of intrinsic motivation. The lowest level of intrinsic motivation was 1.2% as many as 3 students.

3. The initial level of students' curiosity in Learning Science

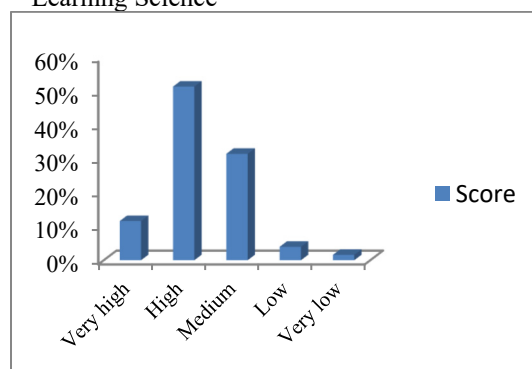


Figure 4: The criteria of students' curiosity in Learning Science.

Figure 4 above elaborates the percentage of students' curiosity level in science lessons. There were 29 students as many as 12% on the very high level of students' curiosity in science lesson. There were 129 students as many as 51% on the high level.

In the medium level of curiosity detected were 79 students as many as 32%. The low level of curiosity was 4% as many as 10 students. The lowest level was 1.6% as many as 4 students.

The data analysis showed the relationship between student's interest, intrinsic motivation and curiosity in Learning Science was calculated through product moment correlation coefficient. The level of significance used was 0.05.

4. The correlation students' interest toward curiosity

Table 2: Table of RegressionStatistic of interest and Curiosity in Learning Science.

Regression Statistics	
Multiple R	0,991639
R Square	0,983348
Adjusted R Square	0,983281
Standard Error	1,833675
Observations	251

Table 3: Table ANOVA.

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Sign. F</i>
Reg.	1	49442	49442	14704,5	1,899E-223
Residual	249	837,23	3,36		
Total	250	50279			

Table 4: Coeffisien Regression of Interest and Curiosity.

	<i>Coef.</i>	<i>Stand Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-3,3	0,566	-5,77454	2,3E-08
Need	1	0,008	121,2619	2E-223

In table 3, the ummary output was obtained multiple R is 0.992 that indicates a very strong relationship between students' interest and curiosity. The linearity relationship between interest with curiosity is when the interest increased then the students' curiosity towards science lessons also increased. In the significance column *F* in the ANOVA table was obtained the *F*-value close to zero, which means that interest is very influential on curiosity. Vice versa if the interest is reduced it will

affect the curiosity of students. In *significance F* column on the ANOVA table was obtained *F*-value < 0,05 or *p-value* > *t-Statistic* that means interest is very influence on curiosity.

5. The correlation of intrinsic motivation toward curiosity

Table 5: Table of Regression of intrinsic motivation and Curiosity in Learning Science.

Regression Statistics	
Multiple R	0,974
R Square	0,983
Adjusted R Square	0,949
Standard Error	3,185
Observations	251

Table 6: Table ANOVA.

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Sign. F</i>
Reg	1	47753	47753	4707	1,01E-163
Residual	249	2526,4	10,15		
Total	250	50279			

Table 7 : Coeffisien Regression of Intrinsic Motivation and Curiosity.

	<i>Coef.</i>	<i>St. Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-16,27	1,1863	-13,7	2,8915E-32
Motivation intrinsik	1,01	0,0148	68,6	1,01E-163

In table 5. It shows the summary of the output obtained multiple R-value is 0.974 shows a very strong relationship between intrinsic motivation and curiosity of students. The linearity relationship between intrinsic motivation and curiosity is the students' curiosity toward science lessons increased due to intrinsic motivation increased. In the significance *F* column in the ANOVA table, *F*-value

$<0,05$ or p -value $>t$ -Statistic means intrinsic motivation is very influential on curiosity.

6. Multiple correlations between student's interest, intrinsic motivation and curiosity in Learning Science

Table 8: Table of Regression of interest and Curiosity in Learning Science.

<i>Regression Statistics</i>	
Multiple R	0,99163971
R Square	0,98334932
Adjusted R Square	0,98321504
Standard Error	1,83731387
Observations	251

Table 9: ANOVA.

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Sign. F</i>
Regression	2	49441,8	24720,9	7323,1	2,87E-221
Residual	248	837,1791	3,37572		
Total	250	50278,98			

Table 10: Coeffisien Multiple Regression of Intrinsic Motivation and Curiosity.

	<i>Coef</i>	<i>St. Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-3,4	0,89529	-3,746	2E-04
Need	0,95	0,0425	22,369	2E-61
Intrinsic Motivation	0,01	0,04592	0,1215	0,903

In table 8, the summary output obtained a multiple R -value of 0.992 shows the level of a very strong relationship between interest, intrinsic motivation and student curiosity. Linearity relations between interests, intrinsic motivation with curiosity is that students' curiosity about science lessons increases due to greater intrinsic interest and motivation. In the significance F column in the ANOVA table, the F value is close to zero where the value of $F < 0.05$ or p -value $> t$ -statistic, which means that interest is very influential on curiosity.

3.2 Discussion

To maximize the achievement of learning outcomes in the activities of learning in the classroom need to be noticed some important aspects of students' success to understand the lessons delivered by teachers. Among these important aspects are interest, intrinsic motivation, and curiosity. Interest in a lesson is one of the important components that need to be grown in students when the learning process occurs. Interest is related to a clear readiness to acquire new knowledge. Interest relates to the cognitive abilities and attitude component that have relation with a person's psychological positive experiences of students in a lesson (Hidi et al, 2004).

Hidi (2001, 2006) said that Psychological involvement in learning can promote the focus of attention, enhancement of cognitive function, persistence and learning involvement.

Several researchers had argued that individual interests were improving in three stages of interest development: (a) An interest that emerges first is due to being built or triggered by external stimuli; (b) The stable interest that exists on a certain (limited) learning phase; and (c) Individual interest appears from a relatively long-standing tendency to engage in a particular object that liked. The development of the interest stage will affect the quality of the interest to be an enduring interest in the individual that will develop into intrinsic motivation (Hidi & Renninger, 2006; Krapp, 2007). Therefore, an interest in a lesson will foster intrinsic motivation in learning the new knowledge.

Deci and Ryan (1985) opined, there is relation motivation intrinsic and interest to develop individual capacity.

One of the keys fostering in learning is curiosity. Curiosity is a form of intrinsic motivation that drives active learning, mastery learning and independent exploration (Oudeyer et al, 2016). When someone has been motivated intrinsically then the curiosity become increased. Because intrinsic motivation encourages students to search for information independently to gain competence.

4 CONCLUSIONS

The findings indicated that the most of initial students' level of interest, intrinsic motivation, and curiosity in learning science positively in very high and high level. The relationship between interest, intrinsic motivation and, curiosity toward science

derived from multiple R was 0.992 that indicates a very strong level of relationship between interest, intrinsic motivation and, student curiosity. The linearity relationship between interest, intrinsic motivation and curiosity is the students' curiosity towards science lessons increased due to increased interest and intrinsic motivation. In the significance F column in the ANOVA table, the F -value $<0,05$ or p -value $>t$ -Statistic means interest is very influential on curiosity. The conclusion is supported by a significant relationship between the three support of students' psychological aspect and success the learning process that comes from internal students.

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