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### **Undergraduate Students' Intrinsic Motivation and its Correlation with the Economics-Mathematics Learning**

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Intrinsic motivation is deemed significant in one's activity because it positively affects one's behavior and performance. This descriptive-correlational research employs survey instruments with 37 statements, scoring 1 (totally untrue) to 7 (very true). It aimed to know the intrinsic motivation level in learning mathematics and its correlation with economics-mathematics subject learning achievement. The study participants were 93 undergraduate students majoring in accounting and management. The result of the study showed that students had moderate intrinsic motivation in terms of felt pressure and tension; high intrinsic motivation in terms of interest or enjoyment; perceived competence; effort or importance; and perceived choice; and very high intrinsic motivation in terms of value or usefulness. Furthermore, the study revealed that the achievement level is high. However, there is no significant correlation between students' intrinsic motivation and their achievement in economics and mathematics. The result implies that students' intrinsic motivation does not necessarily correlate with academic achievement. This study recommends future research consider other factors that could be associated with students' achievement, such as instructional strategies and methods, students' extrinsic motivation, curriculum, or the learning environment.

**Keywords:** *intrinsic motivation, undergraduate students, Economics-Mathematics, achievement, Indonesia*

Mathematics is an important subject for students since it is in the curriculum from elementary school to middle school to university. Undergraduate students majoring in accounting and management had mathematics subjects in their curriculum as well, and economics-mathematics is one of them. Many researches have been conducted to search for factors that affect students in learning of mathematics, and one of those factors is motivation (Wawan & Retnawati, 2022). Koon (2016), who conducted research on undergraduate students, also stated that motivation affects students' mathematics achievement.

Motivation is an important central factor in students' performance and involvement in learning (Monteiro et al., 2015). One type of motivation that affects learning is intrinsic motivation (Zaccone & Pedrini, 2019), which is a form of motivation that comes from someone's urge to achieve something in the activities he participates in (Saija, 2019). When students' learning is intrinsically motivating, they will search for more knowledge on their own (Leng et al., 2010). Intrinsic motivation, according to Ryan dan Decy (Saeed & Zyngier, 2012), positively affects behavior, performance, and someone's circumstances. Furthermore, someone with good intrinsic motivation will perform tasks voluntarily and with persistence without any external reward (Radovan & Makovec, 2015), and he will do the tasks happily (Leng et al., 2010). So important is intrinsic motivation for someone to take part in an activity that intrinsic motivation measurement instruments were made, and one of them is the Intrinsic Motivation Inventory (IMI), which is a measurement with some dimensions (multidimensional) based on the self-determination theory used to measure the subjective experience of an activity participant (Monteiro et al., 2015). The intrinsic motivation dimensions that can be measured using this instrument are interest/enjoyment, perceived competence, effort/importance, felt pleasure and tension, perceived choice, value/usefulness, and relatedness (Astari, 2018).

Realizing that economics-mathematics is a mandatory subject stated in the curriculum of accounting and management majors, this is an important subject. This subject discussed the implementation of mathematics in economics, such as sequences and series, linear functions, derivatives, integrals, and matrices (Matdoan et al., 2021). Hence, the primary object of this study is to see the students' intrinsic motivation and its relationship with their achievement.

## **Methodology**

### **Research Design**

This study utilized a descriptive-correlational design. This design was used because the aim of the study is to describe the undergraduate students' intrinsic motivation and its correlation with economics-mathematics learning achievement. Data was gathered using the survey and analyzed quantitatively for frequencies, averages, and correlation.

### **Population and Sampling Technique**

The population of the study was composed of undergraduate students majoring in accounting and management at a selected university. Purposive sampling was used, and 93 students participated in this study.

### **Instrumentation**

An online survey questionnaire using Google Forms was used to gather the data for the students' intrinsic motivation. The questionnaire was adapted from the Intrinsic Motivation Inventory (IMI), which contains 37 statements, scoring 1 (totally untrue) to 7 (very true) for positive statements (or reversing for negative statements). Those 37 statements are divided into six dimensions related to mathematics learning: interest/enjoyment (seven statements), perceived competence (six statements), effort/importance (five statements), felt pressure and tension (five statements), perceived choice (seven statements), and value/useful achievement

statements. While the students achievements were scores taken from their final examination results in economics-mathematics class.

### Analysis of the Data

The data gathered was analyzed through IBM SPSS Statistics version 24. The students' intrinsic motivation scores were used for descriptive analysis on every dimension of intrinsic motivation, and the mean of each intrinsic motivation dimension score and the mean of the whole score were used to determine the category of intrinsic motivation. The intrinsic motivation criteria are divided into five categories based on the intrinsic motivation average score, which are: very low,  $1 \leq IM \leq 2.2$ , low,  $2.2 < IM \leq 3.4$ , moderate,  $3.4 < IM \leq 4.6$ , high,  $4.6 < IM \leq 5.8$ , very high,  $5.8 < IM \leq 7.0$ . Furthermore, the mean and standard deviation of the economics-mathematics test were used to determine the category of the students' achievement, and the last step is the correlational analysis between undergraduate students' intrinsic motivation and their achievement in learning economics-mathematics.

### Ethical Consideration

Prior to the administration of the questionnaire, an applicant was submitted to the mathematics education chairperson for approval. Participants in this research filled out the research questionnaire through a Google Form, and the data were handled with confidentiality.

## Results and Discussion

### Descriptive Analysis on Students' Intrinsic Motivation

The analysis is done using the frequency of each score from 1 to 7, stated in each table for each dimension (Table 1–Table 6), and based on the mean for the overall analysis (Table 7).

### Interest or Enjoyment

**Table 1**

*Descriptive Statistics for Interest and Enjoyment*

	1	2	3	4	5	6	7	Mean	SD
I enjoyed the mathematics class activity very much.	0	0	0	12	28	20	33	5.80	1.07
The mathematics class activity was fun to do.	0	0	0	11	30	26	26	5.72	1.00
I thought the activity in mathematics class was boring.	20	24	21	10	7	5	6	2.99	1.75
The mathematics class activity did not hold my attention at all	30	31	14	7	4	1	6	2.47	1.66
I would describe the mathematics class activity as very interesting	0	1	0	13	24	21	34	5.78	1.15
The mathematics class activity was quite enjoyable	1	0	0	14	19	27	32	5.78	1.18
While I was doing the mathematics class activity, I was thinking about how much I enjoyed it	0	0	2	15	26	20	30	5.66	1.16

Based on the means and standard deviations, the students give a high to very high categorical response to the statements in this dimension. More specifically, based on the frequencies, 87.1% of the students really enjoy, 69.9% feel not bored, 80.6% are interested, and 88.2% feel happy with the activities in the economics-mathematics class. So, the students' response toward the interest/enjoyment dimension showed high and very high interest and enjoyment from the undergraduate students in economics-mathematics classes.

**Competence**

**Table 2**

*Descriptive Statistics for Competence*

	1	2	3	4	5	6	7	$\bar{x}$	s
I think I am pretty good at the mathematics class activity	1	0	10	25	29	18	10	4.88	1.22
I think I did well at mathematics class activity, compared with the other students	2	4	18	22	25	14	8	4.48	1.41
After working at the economics-mathematics class activity for a while, I felt competent	3	0	8	21	31	18	12	4.92	1.35
I am satisfied with my performance in economics-mathematics class.	4	4	12	17	21	18	17	4.82	1.64
I am skilled at economics-mathematics class activity	3	6	17	28	23	10	6	4.25	1.40
I could not do the economics-mathematics class activity very well	18	17	20	18	12	4	4	3.18	1.66

Based on the means and standard deviations of the students, they give a high to very high categorical response to the statements in this dimension. More specifically, based on the frequencies, 61.3% of the students had a good perception, 50.5% had a success perception, 65.5% had a very competent perception, 60.2% had a satisfied perception, and 59.1% of the students had an ability perception towards the activities in economics-mathematics class. But for the quite expert perception, only 41.9% of students' give high and very high categorical responses. So, the student's response toward the perceived competence dimension showed that the students' perception towards the economics-mathematics class activities was high for the competence they had.

**Effort or Importance**

**Table 3**

*Descriptive Statistics for Effort or Importance*

	1	2	3	4	5	6	7	$\bar{x}$	s
I put lots of effort into economics-mathematics class activity.	0	1	2	5	12	30	43	6.12	1.08
I did not try very hard to do the economics-mathematics class activity well.	38	26	16	4	4	3	2	2.22	1.47
I tried to do the economics-mathematics class activity very hard	0	1	3	6	23	28	32	5.83	1.14
It was important to me to do well in economics-mathematics class activity	0	0	1	5	13	25	49	6.25	0.96
I did not put much energy into this economics-mathematics class activity.	12	15	18	18	20	5	5	3.58	1.66

The mean and standard deviation values showed that the students gave high to very high categorical responses to positive statements, but moderate to high categorical responses to negative statements. More specifically, based on the frequencies, 86% of the students had hard efforts, and 93.5% of the students thought that the activities were important. But, 48.4% thought that they gave much energy to the activities in economics-mathematics class. So, these students responses towards the effort/importance dimension showed that they knew the importance of mathematics activities and gave high efforts for them.

**Felt Pressure and Tension****Table 4***Descriptive Statistics for Felt Pressure and Tension*

	1	2	3	4	5	6	7	$\bar{x}$	s
I did not feel nervous at all while doing economics-mathematics class activity	2	3	7	21	23	18	19	5.04	1.48
I felt very tense while doing economics-mathematics class activity	17	13	14	25	13	5	6	3.46	1.74
I was very relaxed in doing economics-mathematics class activity	3	3	14	24	22	13	14	4.66	1.52
I was anxious while working on economics-mathematics class activity	10	17	6	19	19	14	8	4.01	1.84
I felt pressured while doing economics-mathematics class activity	27	16	19	17	6	4	4	2.86	1.69

Based on the means and standard deviations, the students give high to very high categorical responses for positive statements, but moderate categorical responses for the negative statements. More specifically, based on the frequencies, 64.5% of the students didn't feel nervous, 47.3% felt very tense, 82.7% felt relaxed, 35.5% didn't feel anxious, and 66.7% of the undergraduate students did not feel pressured by the activities in economics-mathematics class. So, the students' responses towards the felt pressure and tension dimension showed that most of the accounting and management major students felt neither very anxious nor pressured in the economics-mathematics class activities, but some did feel pressure and anxiety.

**Choice****Table 5***Descriptive Statistics for Choice*

	1	2	3	4	5	6	7	$\bar{x}$	s
I believe I had some choice about doing economics-mathematics class activity	0	2	4	15	35	19	18	5.28	1.20
I felt like it was not my own choice to do the activity in economics-mathematics class	23	15	13	17	16	6	3	3.19	1.77
I did not really have a choice about doing this economics-mathematics class activity	20	14	12	17	15	7	8	3.49	1.92
I felt like I had to do the activity in economics-mathematics class	0	1	3	8	23	28	30	5.76	1.16
I did the economics-mathematics class activity because I had no choice	22	22	15	19	8	3	4	2.94	1.65
I did the economics-mathematics class activity because I wanted to	1	1	7	12	19	24	29	5.53	1.40
I did economics-mathematics class activity because I had to	0	2	1	11	16	28	35	5.85	1.21

Based on the means and standard deviations, the students gave a high to very high categorical response to the statements in this dimension, except for statements related to other choices, for which they gave a moderate categorical response. More specifically, based on the frequencies, 77.4% of the students

felt that they had some choices, 54.8% thought that mathematics was not their own choice, 49.5% felt that there was no other choice, more than 80% of the students felt that they had to do it, and 77.4% of the students perceived that they wanted the activities. So, the students' response towards the perceived choice dimension showed that the students felt that doing activities in economics-mathematics class was a choice that some of the students wanted, but for some other students, the activities weren't their own choice.

**Value or Usefulness**

**Table 6**

*Descriptive Statistics for Value or Usefulness*

	1	2	3	4	5	6	7	$\bar{x}$	s
I believe that economics-mathematics class activity could be some value to me	0	0	2	6	6	20	59	6.38	1.01
I think that doing economics-mathematics class activity is useful to increase my critical thinking ability	0	1	1	4	10	23	54	6.31	1.02
I think that economics-mathematics class activity is important to do because it can make it easier for me to study other subjects	0	1	3	11	12	23	43	5.96	1.24
I would be willing to do the economics-mathematics class activity again because it has some value to me	0	0	2	7	17	26	41	6.04	1.06
I think doing economics-mathematics class activity could help me excel	0	1	2	6	14	31	39	6.03	1.10
I believe doing economics-mathematics class activity could be beneficial to me	1	0	3	2	13	24	50	6.20	1.14
I think that economics-mathematics class activity is important	0	0	4	3	18	17	51	6.16	1.12

Based on the means and standard deviations, the students give high to very high categorical responses to the statement for these dimensions. More specifically, based on the frequencies, 91.4% of the students perceived the activities as beneficial, 93.5% felt that the economics-mathematics activities were useful, and 83.9% felt that mathematics was important for other subjects, worth achieving, and important (92.5%). So, the students' response towards the value/usefulness dimension showed that the students felt the importance of the activities in economics-mathematics class; they were beneficial and worth it.

**Overall Intrinsic Motivation**

**Table 7**

*Descriptive Statistics for Intrinsic motivation*

Intrinsic motivation dimension	Score mean	Category	Overall mean	Overall category
interest/enjoyment	5.33	High		
perceived competence	4.53	High		
effort/importance	5.28	High		
felt pressure and tension	4.07	Moderate	5.08	High
perceived choice	4.83	High		
value/usefulness	6.12	Very high		

Data in Table 7 showed that, as a whole, the undergraduate students' intrinsic motivation for following the activities in economics-mathematics class was categorized as high. The result of the study also showed that undergraduate students had moderate intrinsic motivation in terms of felt pressure and tension; high intrinsic motivation in terms of interest/enjoyment, perceived competence, effort/importance, and perceived choice; and very high intrinsic motivation in terms of value or usefulness.

### Students' Achievement

**Table 8**

*Descriptive Statistics for Students' achievement*

	N	Minimum	Maximum	Mean	Std. Deviation
Test Score	93	15	100	79.91	24.131

The mean test score is 79.91 and is categorized as high compared with the maximum score of 100, but the high standard deviation score gives information about the wide-range distribution of the data.

### Correlation Between Students' Intrinsic Motivation and Achievement

Based on the result in Table 9, the significance value is 0.386, which is greater than 0.05 (alpha), so it can be concluded that there is no significant relationship between undergraduate students' intrinsic motivation and their achievement in economics-mathematics subject learning.

**Table 9**

*Correlation Between Students' Achievement and Intrinsic Motivation*

		Test Score	Intrinsic Motivation
Test Score	Pearson Correlation	1	.091
	Sig. (2-tailed)		.386
	N	93	93
Intrinsic Motivation	Pearson Correlation	.091	1
	Sig. (2-tailed)	.386	
	N	93	93

The results confirm a previous study on the correlation between intrinsic motivation and achievement, which found that there's no correlation between intrinsic motivation and achievement (Yuniar, 2021; Keka, 2022). It can happen that students with high intrinsic motivation do not have high achievement.

The overall mean of the participant responses in this study showed that their intrinsic motivation for the economics-mathematics class activity is categorized as high. More specifically, the results showed that the class activity was interesting to them, they enjoyed it, their perceived competence was high, they put efforts into gaining competence through the class activity, they felt not very anxious nor felt pressures on the class activity, and the students felt the importance of the activities in economics-mathematics class was beneficial and worth it. Some of the students felt that doing activities in economics-mathematics class was a choice, which was wanted by some of the students, but for some other students, the activities weren't their own choice. Another result was that the student was categorized as average. However, there is no correlation between students' intrinsic motivation and their achievement in economics-mathematics learning. This study's result implies that students' intrinsic motivation does not necessarily correlate with academic achievement.



It is recommended to give consideration to other factors that could be associated with students' achievement, such as instructional strategies and methods, students' extrinsic motivation, curriculum, or learning environment.

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