COVID-19 effect: Profile of student learning motivation during online learning

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ABSTRACT

Purpose: This study aims to describe the profile of students' learning motivation in online learning and compare intrinsic motivation and extrinsic motivation. Furthermore, the research also seeks to examine the development of intrinsic and extrinsic motivation over time during online learning.

Design/Methodology/Approach: This survey research was conducted for mathematics learning at the Vocational High School level, involving a sample of 218 students selected by multistage random sampling technique. Questionnaires were administered periodically three times at an interval of six weeks. Data were analyzed using profile analysis.

Findings: The analysis revealed that the intrinsic and extrinsic dimensions of students' learning motivation tend to be parallel, with the intrinsic dimension being higher than the extrinsic dimension. The period of time also affects the development of students' learning motivation, both for the intrinsic and extrinsic dimensions.

Conclusion: The study highlights the importance of independent learning activities in online learning, which tend to develop and encourage the growth of internal motivation, essential for lifelong learning. Teachers are recommended to apply various learning theories in the digital era to increase students' internal and external motivation. In addition to well-designed learning materials, the effectiveness of online learning also depends on motivating interactions between instructors and students. Well-designed materials supported by a variety of communication media make online learning very beneficial.

Keywords: *Extrinsic, Intrinsic, Profile, Motivation, Online Learning.*

1. INTRODUCTION

Online learning is growing rapidly because of the support of the internet, sophisticated technology, and a large market share (Sun & Chen, 2016). The internet provides various media that can be integrated, such as the worldwide web, e-mail, WhatsApp, Facebook, Twitter, Instagram, and so on, making online learning varied. Individual needs that vary in learning due to different thinking styles, cognitive styles, personalities, and so on can be well accommodated in online learning. In addition, the diverse media in e-learning can create an ecosystem where students can communicate and utilize unlimited learning resources. Thus, e-learning increases students' motivation and engagement, helping them become independent learners (Abou El-Seoud, Taj-Eddin, Seddiek, El-Khouly, & Nosseir, 2014).

Online education requires a significant amount of resources and careful planning (Dhull & Sakshi, 2017). In online learning, the teacher does not merely deliver material but also facilitates student learning. The internet and other communication support media serve as a source of learning in online education. The primary role of the teacher is to make the classroom a fun space to motivate them and increase their self-confidence, spontaneity, autonomy, and self-stimulation (Mohseni Takaloo & Ahmadi, 2017). Thus, students can learn independently in a pleasant environment and optimize their learning experience. Online learning has been shown to increase interest and encourage the development of independent study skills of students (Perdana, Jumadi, Rosana, & Riwayani, 2020).

The Covid-19 pandemic, which has affected the world, including Indonesia, has really made online learning the primary mode of education. The government issued a study-from-home policy because the mobility of students, teachers, and other education officers was restricted. This has led to significant changes occurred in the student learning process. Previously, they were used to face-to-face learning, but now they have to learn online through video conferencing, websites, e-mail, WhatsApp, and other mediums. The online learning environment is very different from the face-to-face learning environment, including learning facilities, interactions, communication, time management, and several other things. Students must adapt to the new learning environment, facilitated by various technologies (Chiu, Lin, & Lonka, 2021).

Psychological factors that influence learning have undergone a significant change due to the shift to online learning (Bylieva, Hong, Lobatyuk, & Nam, 2021). In face-to-face learning, the teachers and students share the same physical space, enabling direct communication without the need for any media, allowing for direct communication and discussion. Teachers can pay attention to students fully. The influence of teachers and peers is very large in face-to-face learning. On the other hand, in online learning, students' study in isolation, often from their rooms, and communication occurs through the media, both synchronous and asynchronous. Thus, students must be self-motivated and organized in their learning process (Väljataga & Laanpere, 2010). Students act as learner control who are responsible for their learning process (Granger & Levine, 2010; Kay, 2001; Stary & Totter, 2006).

The shift in the learning paradigm from face-to-face to online learning requires attention to several things, such as self-efficacy and learning motivation (Chiu & Hew, 2018). However, maintaining motivation in online learning is a challenge for students in online learning, as they must equip themselves to be able to learn independently in a new learning environment (Haryati, Sukarno, & Purwanto, 2021; Martín-Sómer, Moreira, & Casado, 2021). Although previously there were a few schools that had organized online learning, but only part of it was in the form of blended learning. Therefore, many students lack prior experience with online learning, especially in terms of learning motivation.

Motivation plays a crucial role in human behavior as individuals engage in activities due to encouragement or motivation. According to (Goyal, 2015), motivation is a process that initiates, guides and maintains goal-oriented behavior. Psychologists who study motivation focus on three basic issues: (1) issues related to triggers for certain actions or behaviors; (2) problems related to a person's desire to move towards a certain goal; and (3) issues related to the persistence of a person in trying to achieve that goal (Woolfolk & Margetts, 2012). Motivation can influence how students approach their education, their relationship with teachers, their dedication to their studies, and their performance in assessments (Chen & Hoshower, 2003; Geijsel, Sleegers, Leithwood, & Jantzi, 2003). Motivation includes states such as urges, desires, plans, goals, intentions, impulses, and intentions. Motivated individuals exhibit voluntary activities that are driven by energy, they persist in showing that behavior over time (Kienzle, 1969).

Motivation is a process that involves a dynamic change in individual behavior (Hjelle & Ziegler, 1992). Motivation can stem from various individual functions, such as studying, interacting, achieving, working, or other functions. The dynamic changes in behavior that result from individual interactions with their environment greatly affect motivation. As an individual characteristic, the phenomenon of motivation comes from various aspects of several issues, such as beliefs, emotions, and awareness (Sorrentino & Higgins, 1986). Motivation is fueled by the inherent activities and curiosity of children, their desire to master knowledge, and the willingness to learn and develop under adult guidance (Ryan & Deci, 2000).

Motivation directs people to act to achieve their goals and to make efforts to achieve their goals (Börü, 2018). When motivated by high motivation, various are completed successfully. Motivation is the key to fostering creativity at work (Amtu, Makulua, Matital, & Pattiruhu, 2020), and it plays an important role in learning. Students who have high motivation develop a strong and lasting sense of awareness (Solichin, Muchlis, & Ferdiant, 2021). If their abilities are not high enough, positive motivation can act as a compensating factor for this deficiency (Majali, 2020). Therefore, it is important to raise and maintained learning motivation. In fact, it is common for many students to struggle with motivation when it comes to academics.

There are two main factors of human motivation: internal factors and external factors. Internal factors refer to needs, interests, curiosity, and pleasures, while external factors refer to environmental influences, such as reward, social pressure, and punishment. Motivation that is driven by one's own pleasure or interest is called intrinsic motivation, while motivation governed by external reinforcement is called extrinsic motivation (Ryan & Deci, 2000; Woolfolk & Margetts, 2012). Intrinsic motivation occurs because someone really wants to see the value in doing

something, while extrinsic motivation occurs because someone does something to achieve certain results (Chen & Hoshower, 2003; Geijsel et al., 2003).

Intrinsic motivation refers to engaging in behavior that is inherently satisfying or enjoyable (Di Domenico & Ryan, 2017). Individuals are said to be intrinsically motivated to do an activity if they do it without a clear reward, other than the activity itself (Deci, 1971). For instance, children fly kites or play soccer in the field without being driven by a specific goal, but because they find pleasure and satisfaction in the activity. By analogy, if in learning students are driven by interest and pleasure to learn, then their learning activities are driven by intrinsic motivation.

Intrinsic motivation is non-instrumental, and it does not depend on any outcome that can be separated from the behavior itself (Di Domenico & Ryan, 2017). Individuals perform activities solely because they feel obliged to do so, not driven by the desire to get prizes, praise, or popularity. For example, students learn not because they want to get good grades or be champions, but because they are driven by the obligation to learn, which will determine their fate. Events that increase perceived self-determination will increase intrinsic motivation, whereas events that reduce perceived self-determination will not determine intrinsic motivation (Deci, 1972).

Extrinsic motivation refers to the performance of behaviors that are fundamentally dependent on the achievement of results that can be separated from the action itself (Legault, 2020). Extrinsic motivation leads to external rewards (Deci, 1972). The children wanted to sing because their parents promised candy. Students want to study hard because they want to be rewarded when they are promoted. A person climbs a mountain because he wants to get popularity and his name is immortalized on the top of the mountain. Gifts, praise, or honors can strengthen a person, thereby encouraging that person to take action. All of these are extrinsic motivations that are instrumental and multidimensional (Di Domenico & Ryan, 2017).

Enforcement of regulations can also lead to extrinsic motivation (Ryan & Deci, 2000). Regulation can result in individuals being rewarded or even privileged. On the other hand, violators of regulations can be punished. The desire for gifts or privileges drives individuals to comply with regulations. On the other hand, individuals naturally try to avoid punishment, so they also try to comply with regulations. The rules for granting scholarships to high achieving students can encourage students to improve their achievements. Rules for cleaning classes for students who are late can encourage students to come to school on time.

Motivation tends to vary in all areas (Ryan & Deci, 2000). Students' motivation to learn in face-to-face learning is different from their motivation to learn in online learning. Research on motivation in online learning has been widely carried out and will tend to increase in the future (Esra & Sevilen, 2021). That motivation in online learning is more in the design of learning materials and trust in the people who build it (Kop, 2011). The design of an effective and sustainable online pedagogy in an online learning environment still needs investigation related to learning motivation (Chiu et al., 2021). This study aims to describe the profile of students' learning motivation in online learning. Intrinsic motivation and extrinsic motivation in online learning are compared. Furthermore, the research also wants to reveal the development of intrinsic motivation and extrinsic motivation over time during online learning.

2. METHOD

This survey research was conducted for mathematics learning at the Vocational High School level in the city of Singaraja involving 218 students as a sample selected by multistage random sampling technique. The questionnaire was administered online three times with an interval of six weeks between one period and the next. This time interval was chosen with the consideration that within a six-week period, the students had experienced sufficient changes in the learning process so their learning motivation also changed.

Learning motivation data were collected using a questionnaire containing statements about motivation, both intrinsic motivation and extrinsic motivation. Students were asked to respond to the statements in the questionnaire. The responses given were used as input to analyze the students' intrinsic and extrinsic motivation levels. This kind of analysis adopts a cognitive approach, assuming that individuals seek to extract from the words and actions of those around them signals about what they know about them (Benabou & Tirole, 2003).

The learning motivation questionnaire consisted of 60 items and measures the intrinsic and extrinsic dimensions based on the learning motivation theory (Good & Brophy, 1990). The intrinsic dimension was measured from indicators of the urge to be actively involved in learning activities, find out things related to learning, and learn independently. On the other hand, the extrinsic dimension was measured from the dimension of encouragement to avoid teacher punishment, the urge to get praise from the teacher, please parents, good grades, and recognition

from friends.

The validity of the contents of the learning motivation questionnaire was tested by the formula involving eight experts in the assessment (Lawshe, 1975). The Lawshe test shows that the Content Validity Ratio (CVR) of all items ranges from 0.79 to 0.82, so it is feasible to use because it has exceeded the minimum limit specified by Lawshe, which is 0.78. The internal stability of the items was tested with Pearson's product moment formula. The test results show that the correlation coefficient of all items exceeds 0.30. So, according to the guidelines, all instrument items are suitable for use (Ebel & Frisbie, 1972). The reliability of the learning motivation instrument was measured by the Cronbach Alpha formula. It turns out that the Cronbach Alpha coefficient is 0.78, exceeding 0.70. Therefore, according to the guidelines of previous researchers, the instrument is suitable for to be used in research (Nunnally, 1978).

Data were analyzed using profile analysis (Desjardins & Bulut, 2020; Ding, 2000). The requirements that must be met are multivariate normality, homogeneity of the covariance variance matrix, and linearity between the dependent variables. There are three tests in the profile analysis, namely the parallel test, level similarity test, and flatness test. The parallel test provides information that the variables in the profile are parallel or not. If the variables are parallel, then proceed with the level similarity test to obtain information that the variables in the profile have the same level. Finally, the flatness test provides information on whether or not there is a change in the mean of each variable in the profile from one period to the next.

3. RESULTS

The correlation coefficient between the Mahalanobis distance and the centroid chi square was obtained at 0.534 with a two-tailed significance of 0.000, so the requirement that the data have a multivariate normal distribution was met. The linearity between the dependent variables is also fulfilled, in which the Wilks' Lambda value is obtained at 0.983 with a significance of 0.022. Box's M test gives a value of 5.960 with a significance of 0.433, which indicates that the data meet the requirements of variance-covariance homogeneity. Thus, data analysis with profile test can be continued. The results of the parallelization hypothesis test are shown in Table 1.

Table 1. Multivariate tests.

Effect		Value	F	Hypothesis df	Error df	Sig.
Period	Pillai's trace	0.152	38.721	2.000	433.000	0.000
	Wilks' lambda	0.848	38.721	2.000	433.000	0.000
	Hotelling's trace	0.179	38.721	2.000	433.000	0.000
	Roy's largest root	0.179	38.721	2.000	433.000	0.000
Period * motivation	Pillai's trace	0.006	1.260	2.000	433.000	0.285
	Wilks' lambda	0.994	1.260	2.000	433.000	0.285
	Hotelling's trace	0.006	1.260	2.000	433.000	0.285
	Roy's largest root	0.006	1.260	2.000	433.000	0.285

Note: *interaction effect.

The results of the paralleled test are presented in the analysis of the period * motivation interaction effect test. The Hotelling Trace test yields F = 1.260, which was consistent with the results of other tests (Pillai's Trace, Wilks' Lambda, Roy's Largest Root) with a significance level (sig.) = 0.285. The significance value is much greater than the specified level of significance, which is α = 0.05, indicating that the intrinsic and extrinsic motivations are parallel. Since the variables in the profile are parallel, the test can be continued to the level similarity test to determine whether the variables are distinct or identical. The results of the level similarity hypothesis test are shown in Table 2. The level similarity test results are shown in the results of the motivation source test. The Hotelling Trace test results in F = 10.407 with a significance level (sig.) = 0.001. The significance value is much smaller than the specified level of significance, namely α = 0.05. Thus, the two profile variables are at different levels or not coincided.

The results of the flatness hypothesis test or the effect of the period variable are also in the Multivariate Test Table in Table 1. The Hotelling Trace test yields F = 38.721, as well as other tests (Pillai's Trace, Wilks' Lambda, Roy's Largest Root) with a significance level (sig.) = 0,000. The significance value is much smaller than the specified level of significance, namely α = 0.05. Thus, the profile is uneven or not parallel to the X-axis. In other words, there is an effect of the three measurement periods on the variables in the profile.

Source	Type III sum of squares	df	Mean Square	F	Sig.
Intercept	9066166.452	1	9066166.452	574256.381	0.000
Motivation	164.294	1	164.294	10.407	0.001
Error	6851.846	434	15.788		

The results of the analysis show that extrinsic motivation and intrinsic motivation in online learning are parallel. Changes in extrinsic motivation and intrinsic motivation from one measurement period to the next tend to occur simultaneously. The results of the level analysis show that there is a difference in the average score of intrinsic motivation and extrinsic motivation in each measurement period, with intrinsic motivation tending to be higher than extrinsic motivation. This difference was observed in each period, as shown in Table 3.

Table 3. Descriptive statistics.

Period	Extrinsic (1)-Intrinsic (2)	Mean	Std. deviation	N
1'st period	1	81.734	3.755	218
	2	82.653	3.804	218
	Total	82.194	3.803	436
2'ed period	1	82.497	3.757	218
	2	83.494	4.116	218
	Total	82.995	3.968	436
3'th period	1	84.470	4.279	218
	2	84.679	4.192	218
	Total	84.575	4.232	436

4. DISCUSSION

That is, in participating in online learning, intrinsic motivation is higher than extrinsic motivation. This can occur, among others, because online learning includes various technologies such as web, email, WhatsApp, Instagram, Twitter, audio conferencing, and video conferencing that are delivered via computer networks. These situations help students to learn at their own pace, according to their own convenience (Dhull & Sakshi, 2017). Even though online learning organizations are the same as learning organizations in real classrooms, the speed of learning and control over learning is highly dependent on the willingness of students. Online learning that prioritizes a more voluntary learning environment requires more internal motivators and fewer external motivators (Kop, 2011).

This finding is in line with the expectations of educators consider, who consider intrinsic motivation to be more desirable and result in better learning outcomes than extrinsic motivation (Ryan & Deci, 2000). It is believed motivation is a stable personal characteristic, and in general, online learners tend to be intrinsically motivated (Hartnett, St. George, & Dron, 2011). The online learning environment is very complex, and students must be able to control their learning process by finding learning resources, communicating, completing assignments, collecting assignments, getting feedback, and so on. To succeed, it takes perseverance, self-management skills, and involvement in various learning activities. Students with the ability to manage the learning environment and have self-efficacy tend to get good learning outcomes (Wang, Shannon, & Ross, 2013).

The results of the analysis also indicate that students' learning motivation increased from one period to the next. It seems that habituation to the use of various learning media plays a major role in increasing student motivation. Online learning has become increasingly diverse, allowing it to adapt to different cultures, styles, and learning motivations (Anderson, 2008). The need for autonomous learning is achieved when students have the freedom to choose learning media and interact in virtual learning activities (Abou El-Seoud et al., 2014). Online learning with learner control and hypermedia provide opportunities for students to navigate learning through the desired learning environment and interact more (Taipjutorus, Hansen, & Brown, 2012). Hypermedia gives students a sense of control over learning, which in turn affects their level of self-confidence and learning motivation (Chou & Liu, 2005).

Extrinsic motivation showed a sharp increase in the last period, which makes sense because online learning has been going on for a long time and has received social support from various parties. Social support is one of the factors that influence extrinsic motivation (Vatankhah & Tanbakooei, 2014), and it can come from teachers,

parents or guardians, peers, and other learning environments. Moreover, social support from teachers and guardians has been found to be related to social support from peers (Rautanen, Soini, Pietarinen, & Pyhältö, 2021). In this context, the statement by previous researchers is very appropriate, which states that the role of parents and peers is dominant in fostering student learning motivation (Solichin et al., 2021).

There are many studies that show the effectiveness of online learning in increasing student learning motivation. Online learning provides better learning outcomes, better perceptions of learning, and better learning motivation (Nguyen, 2015). PeerWise is a recently created online pedagogical tool that allows students to write, share, answer, discuss, and grade multiple choice questions with little or no instructor input. It can provide better learning outcomes, perceptions of learning, and motivation to learn. Online learning involves students in active learning with instructional materials and access to many learning resources.

Teachers are recommended to apply various learning theories in the digital era to increase students' internal and external motivation (Ally, 2004). In addition to well-designed learning materials, the effectiveness of online learning also depends on motivating interactions between instructors and students (Sun & Chen, 2016). Well-designed materials supported by a variety of communication media make online learning provide great benefits. Online learning offers more benefits than face-to-face learning (Bartley & Golek, 2004). Online learning environments provide better results than face-to-face schools because they give students the opportunity to access material from anywhere and anytime (Wang, Li, Malik, & Anwar, 2022).

In the twenty-first century, online learning has developed as a learning platform that is able to engage users to communicate and collaborate in the learning process (Bhagat, Wu, & Chang, 2016). The Covid-19 pandemic has stimulated the development of online learning. Many educators are interested in implementing online learning in an effort to improve learning outcomes within limited learning resources (Nguyen, 2015). Physical classrooms are no longer the main choice for learning. Online learning occurs in an integrated manner by utilizing various applications that form a social network involving students, teachers, and experts. The hope is that students become independent learners with their own motivation to continually develop.

5. CONCLUSION AND RECOMMENDATIONS

The two dimensions of student motivation, intrinsic and extrinsic, are observed to run parallel in online learning. This phenomenon is evident in three measurements of learning motivation, where changes in intrinsic motivation and extrinsic motivation occur simultaneously over time. However, intrinsic motivation is found to be consistently higher than extrinsic motivation across all three measures, aligning with the expectations of educators that intrinsic motivation must be higher than extrinsic motivation in a learning setting. The study reveals an overall increase in both intrinsic and extrinsic motivation, from one measurement period to the next, indicating that the diverse nature of online learning has a positive impact on student motivation. To further enhance student motivation, it is recommended to utilize a more diverse range of media in various formats such as text, audio, and video. By doing so, student motivation can be boosted, leading to an increase in learning enthusiasm and better learning outcomes.

Furthermore, the study shows that extrinsic motivation experienced a sharp increase towards the end of the study period, which may be attributed to the provided online learning environment. To sustain students' learning motivation, it is crucial to seek support from all parties, including parents, families, schools, peers, and the surrounding community. This support can come in forms, including not only material resources but also moral support such as advice or praise.

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