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FACTORS AFFECTING UNIVERSITY STUDENTS' LIFELONG LEARNING IN INDONESIA

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ABSTRACT

The present study investigates the issue of self-directed learning, students' perception towards ICT and social networking as the key factors that affect lifelong learning by focusing on the Indonesian settings. The study follows a correlational research design to investigate and measure the degree of relationship among self-directed learning, and students' perception towards ICT. The research was conducted in Jogjakarta and Riau Province, Indonesia. A total of 216 postgraduate students were chosen for this study by using the simple random sampling method. Data were collected using the instrument developed by Williamson and then analysed using AMOS 23 software. Hypothesis testing was done by using Structural Equation Modelling (SEM). SEM test indicate partial mediation effects of social networking for self-directed learning on lifelong learning was found and full mediation effects of social networking for self-directed learning on lifelong learning. The results imply that lectures should support postgraduate students in order to sharpen their self-directed learning, positive perception towards ICT and social networking in lifelong learning by giving suitable learning methods and proposing a sufficient teaching and learning atmosphere.

Keywords: Lifelong Learning, Self-Directed Learning, Social Networking, Student Perception Towards ICT, Higher Education, Indonesia.



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INTRODUCTION

Previous studies have regenerated the discussion of different possible indicators of lifelong learning in different settings (i.e. educational and work context) (Amel, 2014; Çelebi, Özdemir, & Eliçin, 2014; Hoerniasih, 2019; Luka & Sungsi, 2015; Sahin, Akbasli, & Yelken, 2010). The concept of lifelong learning might have been first used in the literature in the book entitled, *Lifelong Education* by Yeaxlee, published in 1929. As for Longworth (2003), lifelong learning, also known as 'continuing higher education' or 'academic continuing education', is viewed as a critical professional development objective in the twenty-first century. Lifelong learning is usually associated with thinking, learning, planning and practice through self-generated, supported reflective work at a number of levels (Day, 1999). In addition, individuals who have a high level of lifelong education usually live self-controlled lives, are more confident, open-minded, willing to volunteer for causes, positive and active, thereby diminishing a sense of isolation in real life (Lee, 2008).

To promote teachers' further lifelong learning, self-directed learning, social networking and ICT usage become imperative and fundamental. Prior researches also suggested that self-directed learning (Atta & Alghamdi, 2018; Rahardjo, Sumardjo, Lubis, & Harijati, 2016), Social Networking (Andangsari, Gumilar, & Godwin, 2013; Çelebi et al., 2014) and ICT usage (Hubackova & Klimova, 2014) are key characteristics of lifelong learning competencies. However, considerable research has also indicated that most students have the lowest self-directed learning achievement (Alharbi, 2018). Students in higher education also do not optimally utilise information technologies Çelebi et al. (2014) in a classroom. Another study provided evidence that students may feel frustrated because of communication difficulties when performing online collaborative learning activities (Capdeferro & Romero, 2012). Thus, students have difficulties in collaborative learning activities when using ICT.

However, recent studies have revealed that there is no standard framework to indicate factors that successfully contribute towards lifelong learning (Arrigo, Hulme, Sanchez, & Kismihok, 2013; Dolan, 2012). Prior investigation suggested potential factors that influence successful lifelong learning, such as self-directed learning (Atta & Alghamdi, 2018; Van Rensburg & Botma, 2015), social networking (Haseski, Şahin, Yilmaz, & Erol, 2014; Jaleel & Om, 2017) and perception towards ICT (Paula & Danisa, 2017). Thus, individuals with high levels of self-directed learning, social networking and positive perception towards ICT usually reveal a high degree of lifelong learning. Conversely, a low level of lifelong learning skills might be influenced by these factors as well. For example, teachers have not developed as much as self-directed learners (Van Rensburg & Botma, 2015) and reflective thinkers (Gencil & Saracaloğlu, 2018). Sidhu, Kaur, and Fook (2016) found that postgraduate students lack the autonomy for lifelong learning. Although postgraduate students felt that they were more independent (Adams, Sumintono, Mohamed, & Noor, 2018), they were not keen on abandoning their roles as authority figures in the teaching and learning process (Nasri, 2017). In terms of social networking, postgraduate students indicate a great potential for their willingness to employ a repository for materials (Zainuddin, Idrus, & Jamal, 2016). Likewise, they also believe that ICT is very helpful in the teaching process (Al-Munawwarah, 2014; Muslem, Yusuf, & Juliana, 2018; Tasir, Abour, Halim, & Harun, 2012). However, Rahardjo et al. (2016) indicated that Internet usage in Indonesia is still low.

Given that these factors are hypothesised to contribute to lifelong learning, only a few studies have documented the relationship among these variables in lifelong learning. To our knowledge, the effects of self-directed learning, student perception towards ICT and social networking on lifelong learning of students have not yet been explored. The present study concentrates on the indirect effects of social networking between self-directed learning, student perception towards ICT and lifelong learning. At the same time, the current study also determines whether different subgroups of students follow a homogeneous track or a developmental track. Therefore, the researchers plan to expand existing lifelong learning literature by discussing these complex relationships for postgraduate students.



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THEORETICAL FOUNDATION & HYPOTHESIS DEVELOPMENT

Lifelong Learning

The term lifelong learning, which usually represents either social order or the individual in a comprehensive sense (Mahoney, 2017), is referred to simply as adult education or the acquisition of skills and training beyond school (Crick, Broadfoot, & Guy Claxton, 2004). Crick and Yu (2008) conceptualised a complex definition of lifelong learning, which involves a set of dispositions, values and attitudes. It is frequently formed by people's behaviour and dispositions, which are influenced by social, historical, cultural and personal resources. Lifelong learning not only involves informal learning, but also formal learning (Dinevski & Dinevski, 2004; Kalz, 2015; Morgan-Klein & Osborne, 2007) and self-directed learning (Smith & Spurling, 1999) throughout one's life. People who hold a high level of lifelong learning tend to have a set of goals and know how to employ knowledge and competencies. Furthermore, they have a stronger sense of self-directed and self-evaluated learning, information location and learning approach adaptation (Kirby, Knapper, Lamon, & Egnatoff, 2010). Interestingly, a significant and positive association exists between information literacy skills and lifelong learning (Solmaz, 2017) in which students' information literacy skills enhance their positive attitudes towards lifelong learning.

The main purpose of lifelong learning is to endorse the importance of such informal learning and acquire recognition that learning is an intentional and inevitable human activity that merits both encouragement and study by professionals (Kirby et al., 2010). In the Indonesian context, there has not been any integration between school, family and community institutions. However, findings of the study suggest that postgraduate students lack the autonomy for lifelong learning, in which students' level of dependence on supervisors for academic matters is much higher compared with their dependence on digital tools (Sidhu et al., 2016). Previous research has shown close relationships between self-directed learning and lifelong learning (Atta & Alghamdi, 2018; Van Rensburg & Botma, 2015). The success of lifelong learning is the competence to participate in self-directed learning which requires openness to learning chances, good sense of self, taking initiatives and illustrating independence in learning (Van Rensburg & Botma, 2015). Research also show that both the use of ICT tools (Hubackova & Klimova, 2014; Ozdamli & Ozdal, 2015) and social networking (Haseski et al., 2014; Jaleel & Om, 2017) are associated with lifelong learning.

Self-directed Learning

Self-directed learning is a process wherein students take individual responsibility by controlling cognitive (self-monitoring) and contextual (self-management) processes (Garrison, 1997). Long (2000) also identified three dimensions of self-directed learning, namely, motivation, metacognition and self-regulation. For the purpose of the present study, self-directed learning will encompass five constructs: awareness, learning strategies, learning activities, evaluation and interpersonal skills. The majority of research participants reported that they provide various learning opportunities to support their learners' SDL skills, but most respondents were not happy abandoning their roles as authority figures in the teaching and learning process. Nevertheless, they promote self-directed learning skills (Nasri, 2017). Students seem to be unsuccessful in undergoing the whole process of self-directed learning, especially in consistency, time management, performance insight and review (Tjakradidjaja, Prabandari, Prihatiningsih, & Harsono, 2017). Again, Humaira and Hurriyah (2017) indicated that the students have difficulty choosing appropriate learning strategies, doing self-assessment and conducting self-reflection. However, Ahmad and Majid (2011) found that individuals with a high degree of self-directed learning readiness usually employ their initiative and independence to pursue learning in order to gain better insights and knowledge of the subject. Basic study skills and problem-solving competences are approaches used to tackle barriers to learning. Again, in a study conducted by Adams et al. (2018), postgraduate students felt that they were more independent ('I am a highly independent learner') compared with undergraduate students.



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Social Networking

Unal and Akyuz (2015) verified that, in social networking, people usually distribute ideas, interests, comments, messages, videos and images or are looking for people with the same ideas and interests. Many studies were conducted to examine the relationship between self-directed learning and social networking. Researchers indicated that social networking sites are closely associated with students' self-directed learning (Ozdamli & Ozdal, 2015; Rahardjo et al., 2016; Rampai, 2013; Takabayashi, 2015) with moderate correlation (Takabayashi, 2015). In a study conducted by Ozdamli and Ozdal (2015), Mobile Supported Seamless Learning spaces (MSSL), which promote flexibility in the place and time of learning, improved students' self-directed learning and changed their perceptions on seamless learning (Ozdamli & Ozdal, 2015). Stachowiak (2014) found that social networking is also used for the advancement of scientific research institutions and involvement in a broader academic discourse and everyday information seeking. Klamma et al. (2007) reported that digital social networks transform the agency of people by the visibility of 'things' and how they are built, managed and framed in discourses.

Student Perception towards ICT

Abedalaziz, Jamaluddin, and Leng (2013) discovered that postgraduate students have a high level of perception of the usefulness and control of the Internet. For example, the use of Moodle for postgraduate students shows that, despite having great potential is limited to being a repository for materials to enhance lifelong learning (Zainuddin et al., 2016). Students search for relevant information from online media rather than visit the library (Nurhayati, Suciati, & Heriyanti, 2014). They also feel that online media are more satisfying and search engine provides up-to-date research results. However, Internet usage is still low due to limited Internet facilities that affect students' knowledge and willingness to access the Internet (Rahardjo et al., 2016). Relevant research also discussed the relationship between self-directed learning and the use of ICT. ICT has repeatedly been claimed to provide great opportunities for building processes through self-directed learning (Delen, Liew, & Willson, 2014; Rampai, 2013; Sumuer, 2018), thus cultivating lifelong learners (Paula & Danisa, 2017). Specifically, the use of technology has a direct positive relationship with engagement and self-directed learning. Moreover, the level of awareness on ICT and the level of self-directed learning ability have been found to be correlated (Din, Haron, & Ahmad, 2013). Students' meaningful use of ICT tools can also predict perceptions of 21st century learning practices (critical thinking, self-directed learning, creative thinking and problem solving).

Educators reported that they strongly believe technology is an integral part in the teaching and learning process (Almekhlafi & Almeqdadi, 2010), which increases the students' basic communication skills (Sansosti & Powell-Smith, 2008), activity schedules and assignment completion (Kimball, Kinney, Taylor, & Stromer, 2004) and the development of social competencies. Abedalaziz et al. (2013) discovered that postgraduate students have a high-level perception of the usefulness of computers. Interestingly, postgraduate students also had high levels in ICT competency, confidence level in using ICT and satisfaction towards ICT training programmes (Tasir et al., 2012). ICT is said to be very helpful in teaching (Al-Munawwarah, 2014; Muslem et al., 2018). Due to the positive correlation between self-directed learning, social networking, student perception towards ICT and lifelong learning, the researchers hypothesised that self-directed learning, social networking and student perception towards ICT can positively influence levels of lifelong learning.

Based on the theories and previous study above, the researchers formulated a hypothesis to test the relationship among self-directed learning, students' perception towards ICT, social networking and lifelong learning.



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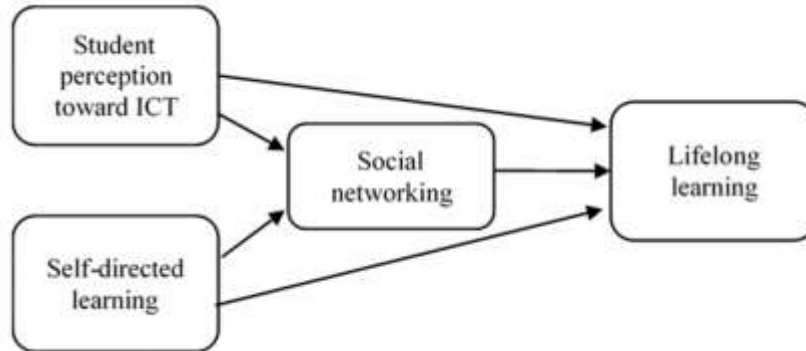


Figure 1. Conceptual Framework of the Study

The two main hypotheses of this study are as follows:

H₁: There is significant mediated effect of social networking on relationship between self-directed learning and lifelong learning.

H₂: There is significant mediated effect of social networking on relationship between student perception towards ICT and lifelong learning.

First, social networking has significantly mediated effect on relationship between student perception towards ICT and lifelong learning; second, social networking has significantly mediated effect on relationship between self-directed learning and lifelong learning. Structural equation modelling was considered suitable for this study to analyses, confirm or disprove the hypothesis formulated and further testing the mediated effect of social networking on relationship between student perception towards ICT, self-directed learning and lifelong learning

METHOD

Research Design

The current research aims to identify relationships between self-directed learning, social networking and student perception towards ICT, which influence lifelong learning using Structural Equation Modelling (SEM) (Byrne, 2012; Chua, 2014). For this reason, the current study follows quantitative approach with a correlational survey research design to examine the degree of relationship between self-directed learning, social networking, student perception towards ICT and lifelong learning (Codd, 1970). There are four main variables in this study, namely, self-directed learning, social networking, student perception towards ICT and lifelong learning. Based on the current literature, the model which combines these variables has not been examined previously, and the fit of this model is evaluated by employing SEM.

Research Population and Samples

The population in the current research consisted of postgraduate students in Jogjakarta and Riau provinces, Indonesia. The current research involved 216 postgraduate students. Among the respondents, 83 (38.4%) are male, and 133 (61.6%) are female. A total of 152 (70.4%) students are below 30 years old, 26 (12.0%) students are aged 31–35 years old, 16 (7.4%) students are 36–40 years old, 14 (6.5%) students are 41–45 years old, 5 (2.3%) students are aged 46–50 years old and three (1.4%) students are aged 50 and above. The simple random sampling method was used to select the participants. Patton (1990) mentioned no rules in determining the sample size but preferred a big sample for research surveys using a questionnaire. Sudman (1976) asserted that a minimum of 100 elements are required for each major group or subgroup in a sample.



Research Instruments

- The Self-Rating Scale of Self-Directed Learning

The SRSSDL, adopted from Williamson (2007), involves five sub-constructs: awareness, learning strategies, learning activities, evaluation and interpersonal skills. A five-point Likert-type scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') was employed to measure SRSSDL. The reliability values of certain scales exceeded the 0.70 desirable standard (awareness, $\alpha = 0.70$; learning strategies, $\alpha = 0.82$; learning activities, $\alpha = 0.81$; evaluation, $\alpha = 0.77$ and interpersonal skills, $\alpha = 0.77$). All composite reliability (CR) values of self-directed learning ranged from 0.60–0.82 and exceeded the 0.6 desirable standard (Awang, 2012). This finding indicated high internal consistency. The average variance extracted (AVE) of the five latent variables ranged from 0.50–0.78 and exceeded the 0.5 common cut-off value. This value demonstrates that this study presents acceptable discriminant validity (Awang, 2012).

- Social Networking Sites Intended Use Scale

The Social Networking Sites Intended Use Scale, developed by Çelebi et al. (2014) involves three sub-constructs classified into the purpose of social interaction and communication, the purpose of knowing and meeting somebody and the purpose of educational purposes. A five-point Likert-type scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') was employed to measure Social Networking Sites Intended Use. Reliability values of certain scales exceeding the 0.70 desirable standard (the purpose of social interaction and communication, $\alpha = 0.87$; the purpose of knowing and meeting somebody, $\alpha = 0.86$ and the purpose of educational purposes, $\alpha = 0.85$). All CR values of social networking sites ranged from 0.85–0.88 and exceeded the 0.6 desirable standards (Awang, 2012). This finding indicated high internal consistency. The AVE of the three latent variables ranged from 0.56–0.67 and exceeded the 0.5 common cut-off value. This value demonstrates that this study presents acceptable discriminant validity (Awang, 2012).

- Lifelong Learning Scale

The Lifelong Learning Scale was adopted from Karal and Kokoc (2010) and involves three sub-constructs classified into professional development, personal development and institutional development. A five-point Likert-type scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') was employed to measure lifelong learning. Reliability values of certain scales exceeded the 0.70 desirable standard (professional development, $\alpha = 0.76$; personal development, $\alpha = 0.70$ and institutional development, $\alpha = 0.70$). All CR values of lifelong learning ranged from 0.65 to 0.77 and exceeded the 0.6 desirable standards (Awang, 2012). This finding indicated high internal consistency. The AVE of the three latent variables ranged from 0.50 to 0.53 and exceeded the 0.5 common cut-off value, which demonstrated that this study presents acceptable discriminant validity (Awang, 2012).

- Students' perceptions towards ICT scale

The Students' Perceptions towards ICT Scale, developed by Bas, Kubiato, and Sünbül (2016), involves three sub-constructs classified into attitude, belief and usage. A five-point Likert-type scale ranging from 1 ('strongly disagree') to 5 ('strongly agree') was employed to measure students' perceptions towards ICT. Reliability values of students' perceptions towards ICT scale exceeded the 0.70 desirable standard ($\alpha = 0.94$). All CR values of students' perceptions towards ICT ranged from 0.86–0.92, exceeding the 0.6 desirable standard (Awang, 2012). This finding indicates high internal consistency. The AVE of the three latent variables ranged from 0.67–0.78 and exceeded the 0.5 common cut-off value. This value demonstrates that this study presents acceptable discriminant validity (Awang, 2012).



Validity and Reliability of Instruments

CFA procedures using AMOS 23.0 were used to explore whether the established dimensionality and the factor-loading pattern fit the Indonesian contexts. As for Kline (2005), prior to conducting analysis with AMOS, univariate normality and multivariate normality must first be fulfilled. To examine normality, the skewness and kurtosis values of each item was used, ranging from -1.96 to $+1.96$ at the 0.05 significant level (Hair, Black, Babin, & Anderson, 2010). In terms of multivariate normality (Mardia, 1974) the multivariate kurtosis coefficient and critical ratio should be examined. The data are viewed to be not normally distributed when the critical ratio for all the items in the a priori model is smaller than 8.0 (Kline, 2005). In terms of univariate normality, the results of the preliminary analysis of all the measures of lifelong learning, self-directed learning, student perception towards ICT and social networking reach univariate normality (skewness and kurtosis values are from -1.108 to 1.647). In terms of multivariate normality, the kurtosis coefficient is 554.284 with a critical ratio of 60.016, indicating that the data set in this study is not normally distributed. Therefore, bootstrapping procedure was used to obtain more accurate and stable parameter estimates for this data set (Awang, 2012; Hayes, 2009).

In terms of validity, a medium level of correlation (0.469 – 0.666) exists between the constructs. The analysis of the correlations revealed that the correlation between student perception towards ICT and lifelong learning is significant and moderate ($r = .469, p < 0.01$), that between student perception towards ICT and social networking sites is significant and moderate ($r = .587, p < 0.01$) and that between student perception towards ICT and self-directed learning is significant and moderate ($r = .637, p < 0.01$). In addition, the correlation between lifelong learning and social networking is significant and moderate ($r = .553, p < 0.01$), that between lifelong learning and self-directed learning is significant and moderate ($r = .659, p < 0.01$) and that between social networking and self-directed learning is significant and moderate ($r = .666, p < 0.01$) (see Table 1). These correlations indicate that the discriminant validity of the variables are reached because the correlation matrix yields correlations that are less than 0.90 (Kline, 2005).

Table 1
Inter-correlations among the variables in the study

	Student perception towards ICT	Lifelong learning	Social networking	Self-directed learning
Student perception towards ICT	1	.469**	.587**	.637**
Lifelong learning		1	.553**	.659**
Social networking			1	.666**
Self-directed learning				1

Internal consistency has been checked by looking at the composite reliability values as suggested by (Hair, Sarstedt, Ringle, & Gudergan, 2018). It has replaced the traditional usage of Cronbach's alpha because it offers a better estimate of variance shared by the respective indicators and because it uses the item loadings obtained within the homological network (Hair et al., 2010). From Table 2, composite reliability values are higher than 0.84, thus exceeding the minimum cut off mark of 0.7 (Bagozzi & Yi, 1988). Even the Cronbach's alpha values are higher than the cut off mark, the range between 0.84-0.95 is acceptable.



Table 2
Reliability test

Variables	Items	Cronbach's alpha	Composite reliability	Status
Student perception towards ICT	9	0.95	0.96	Reliable
Lifelong learning	9	0.84	0.85	Reliable
Social networking	12	0.92	0.93	Reliable
Self-directed learning	17	0.94	0.95	Reliable

Data Analysis

In the current research, confirmatory factor analysis (CFA) and descriptive statistics were carried out. CFA procedures using AMOS 18.0 were used to explore whether the established dimensionality and the factor-loading pattern fit the Indonesian contexts. Moreover, a measurement model between the related variables for each construct, which was developed from theories and empirical studies, were examined. To analyse the indirect effects, the bootstrapping procedure with implementing of bias corrected percentile method (Guan, 2003) was carried out. However, the Maximum Likelihood Bootstrapping procedure with bootstrap sample of 1000 and bias correction confidence interval (CI) of 95% was performed in the current research (Mohamad, Mohammad, Ali, Mat, & Awang, 2018). Goodness-of-fit is examined through chi-square (χ^2) ($p > 0.05$), comparative fit index (CFI) >0.90 , Tucker Lewis index (TLI > 0.90) and root mean-square error of approximation (RMSEA <0.08) (Awang, 2012). In addition, Cronbach's alpha coefficients, CR and AVE were calculated. Cronbach's alpha was computed to determine the reliability of the instrument (total and sub-constructs). CR takes into account that indicators have distinct loadings, whereas AVE captures the variance of its indicator (Awang, Afthanorhan, & Asri, 2015; Mohamad et al., 2018). According to Hair et al. (2010), alpha values ranging from 0.60–0.70 are satisfactory. CR should be more than 0.60, and AVE should be higher than 0.50 (Awang, 2012; Mohamad et al., 2018).

RESULTS

Demographic Information of Participants

Among the participants, 83 (38.4%) are male, and 133 (61.6%) are female. A total of 152 (70.4%) students are below 30 years old, 26 (12.0%) students are aged 31–35 years old, 16 (7.4%) students are 36–40 years old, 14 (6.5%) students are 41–45 years old, 5 (2.3%) students are aged 46–50 years old and three (1.4%) students are aged 50 and above. A total of 136 (63.0%) students are single and eighty (37.0%) students are married.

Table 3
Demographic

Demographic	Category	Frequency	Percentage
Gender	Male	83	38.4
	Female	133	61.6
Age	Less than 30 years	152	70.4
	31-35 years	26	12.0
	36-40 years	16	7.4
	41-45 years	14	6.5
	46-50 years	5	2.3
	More than 50 years	3	1.4
	Status	Single	136
Married		80	37.0



Measurement Models

CFA procedures were used to confirm the factorial validity of variables. The item-level factor analysis of self-directed learning provided an acceptable fit in terms of $\chi^2 = 273.716$, $\chi^2/df = 2.511$, CFI = 0.928, TLI = 0.910 and RMSEA = 0.084. The item-level factor analysis of lifelong learning provided an acceptable fit in terms of $\chi^2 = 63.728$, $\chi^2/df = 2.655$, CFI = 0.934, TLI = 0.901 and RMSEA = 0.088. The item-level factor analysis of social networking provided an acceptable fit in terms of $\chi^2 = 156.412$, $\chi^2/df = 3.067$, CFI = 0.933, TLI = 0.914 and RMSEA = 0.098. The item-level factor analysis of student perceptions towards ICT provided an acceptable fit in terms of $\chi^2 = 60.419$, $\chi^2/df = 2.517$, CFI = 0.979, TLI = 0.968 and RMSEA = 0.084. The results of these factor analyses are indicated in Table 4.

Table 4
Examination of the measurement model

Model	χ^2	χ^2/df	CFI	TLI	RMSEA
Self-directed learning	273.716	2.511	0.928	0.910	0.084
Lifelong learning	63.728	2.655	0.934	0.901	0.088
Social networking	156.412	3.067	0.933	0.914	0.098
Student perceptions towards ICT	60.419	2.517	0.979	0.968	0.084

The item-level factor analysis for all variables provided an acceptable fit in terms of $\chi^2 = 249.43$, $\chi^2/df = 2.43$, CFI = 0.856, TLI = 0.848 and RMSEA = 0.071. These correlations indicate that the discriminant validity of the variables are reached because the correlation matrix yields correlations that are less than 0.90 (Kline, 2005) (see Figure 2). The AVE of the all latent variables ranged from 0.57–0.76 and exceeded the 0.5 common cut-off value. This value demonstrates that this study presents acceptable discriminant validity (Awang, 2012) and CR values of all variables ranged from 0.62 to 0.75 and exceeded the 0.6 desirable standards (Awang, 2012).

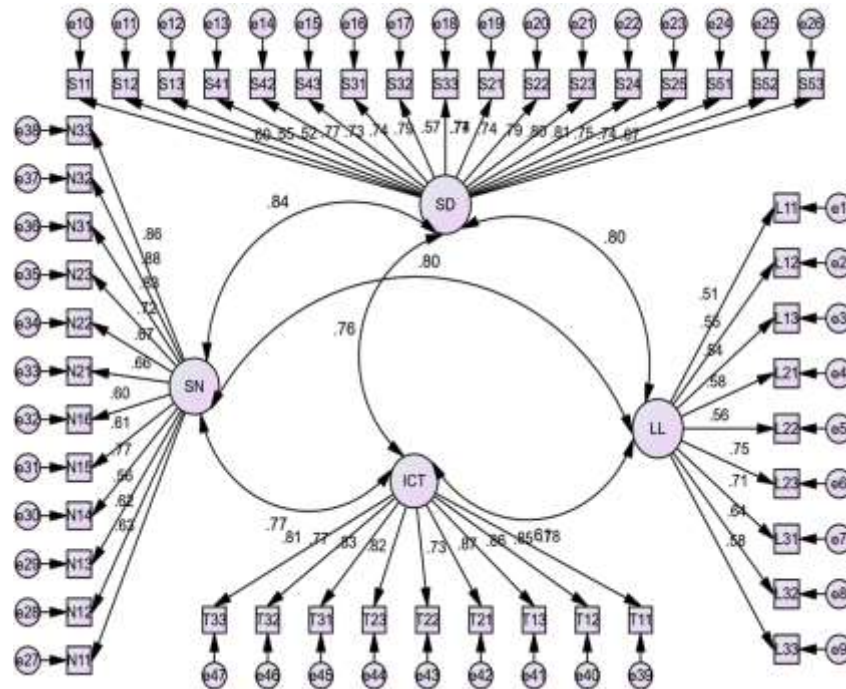


Figure 2. Measurement Final Model



Testing the Hypothetical Structural Model

Outcomes of the SEM analysis revealed the hypothetical structural model at $\chi^2 = 2115.391$, $\chi^2/df = 2.076$, RMSEA = 0.071, TLI = 0.842 and CFI = 0.851. All evaluations resulted in acceptable model fit and the factor loading values exceed the 0.50 desirable standard (Hair et al., 2010). Table 5 shows that the hypothetical structural model is sound.

Table 5
Results of the hypothetical structural model

Model	χ^2	χ^2/df	CFI	TLI	RMSEA
Hypothetical Structural Model	2271.098	2.229	0.864	0.857	0.063
	2115.391	2.076	0.851	0.842	0.071

Note: χ^2 : Chi-square goodness of fit; df: Degrees of freedom; CFI: Comparative Fit Index; TLI: Tucker-Lewis Fit Index (TLI); RMSEA: Root Mean Square Error.

In addition, the model of CFA presented in Figure 3 became the finalised model that indicated relationships among self-directed learning, social networking, student perceptions towards ICT and lifelong learning in the Indonesian context.

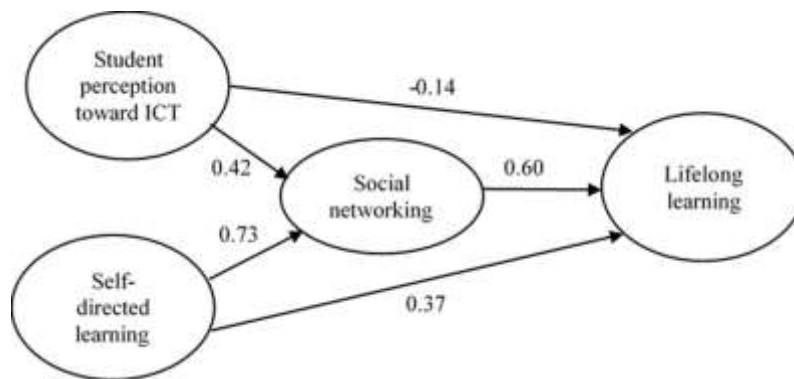


Figure 3. Final Model of the Study

Next, the mediation effects were tested using the bootstrapping procedure. The role of students' social networking as a mediator between self-directed learning, student perception towards ICT and lifelong learning was tested for the Indonesian context. Table 6 lists the results of the mediating effect analysis using bootstrapping procedure.

Table 6
Outputs of the mediating effect

Path	Direct Effect		Indirect Effect		Result
	B	p value	B	p value	
SDL→SNS→LLL	0.350	0.001	0.490	0.004	Partial Mediation
SPI→SNS→LLL	-0.119	0.190	0.774	0.001	Full Mediation

Note: SDL: self-directed learning; SPI: student perception towards ICT; SNS: social networking sites; LLL: lifelong learning.



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- The mediated effect of social networking on relationship between self-directed learning and lifelong learning.

The researchers assumed that self-directed learning positively influenced lifelong learning. Significant relationships existed between the two constructs ($\beta = 0.350, p < 0.01$). Students who utilise self-directed learning and perform well in lifelong learning were fully supported. Self-directed learning is one of the factors contributing to lifelong learning. However, partial mediation effect of social networking ($\beta = 0.490, p < 0.05$) for self-directed learning on lifelong learning. The results corroborated that students who hold self-directed learning with high social networking sites can possess good lifelong learning.

- The mediated effect of social networking on relationship between student perception towards ICT and lifelong learning.

The researchers assumed that teacher perception of ICT negative influenced lifelong learning. No significant relationships existed between the two constructs ($\beta = -0.119, p > 0.05$). students who utilise teacher perception of ICT and perform did not well in lifelong learning were fully supported. Teacher perception of ICT is not the factor contributing to lifelong learning. However, a full mediating effect of social networking ($\beta = 0.774, p < 0.05$) for student perception towards ICT on lifelong learning. The researchers' results affirmed that students who have a negative perception of ICT with high social networking sites can possess good lifelong learning.

DISCUSSION & IMPLICATION

The importance of lifelong learning has received strong support from researchers in the last few decades. Thus, Longworth (2003) viewed lifelong education as a critical professional development objective. This development has facilitated the testing of whether self-directed learning, social networking and student perception of ICT enhance lifelong learning. This research aims to test the relationships among self-directed learning, social networking and teacher perception of ICT which may affect lifelong learning amongst postgraduate students in Indonesia. Considering the important role of collaborative teacher learning, prior studies are surprisingly limited on how the social networking indirectly affect the relationships among self-directed learning, student perception of ICT and lifelong learning.

H1: SEM analysis indicated social networking is a considerable partial mediator between self-directed learning and lifelong learning. The current research corroborates the hypothesis that students with vital social networking sites are likely to mediate the relationship between self-directed learning and lifelong learning. These findings support previous research, which indicated that social networking sites is a mediator (Al-Rahmi & Zeki, 2017) in students' achievement. One explanation is that social networking effectively activates perceived usefulness, perceived enjoyment and perceived ease of use on collaborative learning, which might highly affect students' performance in learning. One possible reason for this positive relationship is that students who focus on self-directed learning can use various approaches to follow lessons so long as their life span. These learners usually design, supervise and assess their own knowledge. Van Rensburg and Botma (2015) explained that to determine the success in lifelong learning, students must engage in self-directed learning which requires openness to learning opportunities, good self-concept, taking initiative and illustrating independence in knowledge. In addition, this relationship can be maximised by a component of social networking.

H2: The bootstrapping analysis proved that social networking plays a full mediating role in the relationship between student perception towards ICT and lifelong learning. This means that the presence of social networking is a very important factor towards lifelong learning. The main reason for these findings is that ICT tools effectively provide a great potential for teaching and learning for discussing, evaluating, organising, supporting and sharing ideas. Earlier research proved that ICT tools can predict perceptions of 21st century learning practices (critical thinking, self-directed learning, creative thinking and problem solving). Moreover, postgraduates had a high level of ICT competency and confidence in using ICT (Tasir et al., 2012). Thus, the students found ICT very helpful (Al-



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Munawwarah, 2014; Muslem et al., 2018). This study has emphasised no direct relationship between student perception of ICT and lifelong learning. By contrast, the findings in this study weaken those of previous research (Hubackova & Klimova, 2014; Ozdamli & Ozdal (2015) indicating that ICT is positively related to lifelong learning. This construct is also important in encouraging the lifelong learning of students. ICT usually recognises learning opportunities anywhere/anytime, enhances engagement, provides opportunities for differentiation of instruction, expands communication and improves motivation. Concomitantly, the primary rationale of the lifelong learning concept is the prompt increase in the amount of information and the requirement for frequent career transformations. This relationship can be maximised by a component of social networking.

The results of the current study present further evidence that self-directed learning, student perception towards ICT and social networking positively affect lifelong learning. The researchers noted the partial mediating effects of social networking for self-directed learning on lifelong learning was found and of social networking for social networking on lifelong learning. Furthermore, the analysis showed a significant difference in social networking and lifelong learning, whereas a non-significant difference in student perception towards ICT and self-directed learning was observed. This research confirms the importance and significance of considering self-directed learning, social networking, students' perception of ICT and lifelong learning. Similarly, students' perception of ICT has positive impacts on social networking. Such social networking also serves as a partial mediator of the effect of self-directed learning on lifelong learning. On the contrary, social networking serves as a partial mediator of the effect of teacher perception of ICT on lifelong learning. By summarising these results, the researchers argue that the social networking is powerful factors that can be influenced by self-directed learning and students' perception of ICT, and in turn, influence lifelong learning. The findings also imply that social networking is an important factor in the relationships among self-directed learning, student perception of ICT and lifelong learning. Hence, the quality of student life in Indonesia can be improved by promoting these factors.

One practical implication for lecturer is that they should support postgraduate students in order to increase their self-directed learning and social networking in lifelong learning by giving suitable learning methods and proposing a sufficient teaching and learning atmosphere. In addition, on the basis of acquired findings, social networking are positive full mediators between student perception of ICT and lifelong learning. Lectures can help postgraduate students to have robust perception of ICT and require continuing use of social networking beyond the classroom in terms of maximizing postgraduate student performance in lifelong learning.

RECOMMENDATION AND CONCLUSIONS

This research confirms the importance and significance of considering self-directed learning, social networking, student perception of ICT and lifelong learning. Social networking serves as a full and partial mediator of the effect of student perception of ICT and self-directed learning on lifelong learning. By summarising these results, we argue that the student perception towards ICT and self-directed learning are powerful factors that can be influenced by social networking, and in turn, influence lifelong learning. The findings also imply that social networking is an important factor in the relationships among self-directed learning and student perception of ICT and lifelong learning. Hence, the quality of student life in Indonesia can be improved by promoting these factors.

This current study has several limitations. Fully describing the relationship between two or more variables is difficult in a correlational study, although SEM proposes the results of causal relationships. Future research should examine the effects of self-directed learning, student perception towards ICT, social networking and lifelong learning by using an experimental study because the current study cannot explain the causal effect among these variables. Future studies should also extend the discussion by examining and comparing students' gender in self-directed learning, student perception towards ICT, social networking and lifelong learning. Moreover, the role of social networking as a mediator between self-directed learning, student perception towards ICT and lifelong learning should be examined on the basis of gender differences because substantial differences of those variables have been found.



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