

Review of Learning Styles on Student with Self-Regulated Learning

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The aim of this study was to test the theoretical model of the effects of field-dependent and field-independent learning styles on students with self-regulated learning. The subjects of this study were students of Faculty of Education in Islamic Studies at Islamic State College in Kudus. The samples ($N = 239$) were collected using simple random sampling method where questionnaires were completed in the form of scales. The data was analyzed using SEM. The results showed that the proposed model fit the data ($p = .037$, $GFI = .951$, $AGFI = 923$, $TLI = .985$, and $RMSEA = .037$). The field-dependent learning style had significant negative effects on the three learning components of self-regulated learning (motivation, meta-cognition and behavior); while the field-independent learning style had significant positive effects on the three learning components of self-regulated learning (motivation, meta-cognition and behavior).

Keywords: field-dependent, field-independent, learning style, self-regulated learning

Penelitian ini bertujuan untuk menguji model teoretik tentang pengaruh tipe gaya belajar *field-dependent* dan *field independence* terhadap belajar berdasar regulasi diri mahasiswa. Populasi dalam penelitian ini adalah seluruh mahasiswa program studi Pendidikan Agama Islam (PAI), Jurusan Tarbiyah, Sekolah Tinggi Agama Islam Negeri (STAIN) Kudus. Sampel penelitian ini berjumlah 239 yang diambil melalui tehnik pengambilan sampel *simple random sampling*. Adapun teknik pengumpulan data yang digunakan dalam penelitian ini adalah kuesioner dalam bentuk skala. Data dianalisis dengan menggunakan Model Persamaan Struktural atau *Structural Equation Modeling* (SEM). Hasil penelitian menunjukkan bahwa, model yang dirancang dalam penelitian ini sesuai atau layak ($p = .037$, $GFI = .951$, $AGFI = 923$, $TLI = .985$ dan $RMSEA = .037$). Gaya belajar *field-dependent* berpengaruh signifikan secara negatif terhadap tiga komponen belajar berdasarkan regulasi diri yaitu motivasi, meta-kognisi dan perilaku. Sementara gaya belajar *field independence* berpengaruh signifikan secara positif terhadap tiga komponen belajar berdasarkan regulasi diri yaitu motivasi, meta-kognisi dan perilaku.

Kata kunci: gaya belajar, *field-dependent*, *field-independent*, belajar berdasarkan regulasi diri

Student's learning process and motivation to learn have been the main focuses of education researchers. Researchers proposed various theories and models in order to understand these subjects. One of the most frequently used models in analyzing the learning process is the 3P theory model by Dunkin and Biddle (1974; cited in Chan, 2003; 2007). This theory associates the main components in classroom learning into "3Ps". "Presage" is the characteristics of students in the context of teaching, "Process" is the teaching and learning process, and "Product" is the result or achievement of learning. In addition to motivation to

learn, learning approach is also one of the important factors of individual's learning process studied by many researchers.

One of the scientific approaches to understand learning behavior is self-regulated learning (Phan, 2008; Barnard, 2008). According to Zimmerman (1989), a student is considered to have self-regulated learning when he/she is an active player in the learning process, from having the motivation, meta-cognition, and behavior. Therefore, self-regulated learning is a process that encourages the individual to manage his/her thoughts, behavior, and emotion in order to successfully accomplish the process of learning. Based on this understanding, self-regulated learning can also be defined as "managing or directing oneself in the process of learning" or "learning using self-management or self-directing".

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Schunk and Ertmer (1999) state that self-regulated learning is a cyclical process. Zimmerman (2000) explains that there are three phases of regulation model. First, the forethought phase refers to the act of preparing step-by-step planning prior to performing an action. Second, the performance (volitional) control phase encompasses the processes prior to learning which affects attention and behavior. Third, the self-reflection phase takes place after the individual responds to his/her efforts.

Self-regulated learning model regards students as active participants of the learning process. According to Alsa (2005), self-regulated learning is in line with two of the four pillars of education stated by UNESCO, which are "learning to do" and "learning how to learn".

Learning or the training of performing an action; how students adapted their knowledge to accomplish various tasks. Self-regulated learning is in accordance with this pillar, as it is typically identified in the proactive nature of students throughout their learning process, such as collecting, processing, organizing, elaborating and transforming information. The "learning how to learn" pillar is learning to manage the mental process or regulate meta-cognition. This pillar is basically about learning using meta-cognition, an important component in self-regulated learning. As stated by Evensen, Salisbury-Glennon, and Glenn (2001), "learning how to learn" demanded a high degree of self-regulation. The learning activity would be effective if students use self-regulated learning.

Self-regulated learning is essential in the learning process (Jarvela & Jarvenoja, 2011; Zimmerman, 2008) because it helps the individuals to create a better learning habit and enhances their learning abilities (Wolters, 2011), implements learning strategies for higher academic achievements (Harris, Friedlander, Sadler, Frizzelle, and Graham, 2005), observes performance (Harris et al., 2005) and evaluates academic progress (De Bruin, Thiede, and Camp, 2011).

Based on the previous statements, it could be concluded that self-regulated learning is crucial in the learning process. It is also a part of an individual's effort to self-manage his/her activities through meta-cognition, motivation and pro-active behavior. Self-regulation is not a mental or academic ability, but how an individual is able to process and transform in an activity.

In the field of Psychology, every individual is believed to be unique. They have their own feelings, thoughts and ability to develop his/her own interests. Similarly, they

have their own way to develop their feelings, thoughts and interests. This explains how they process and react differently to external needs. Studies from several researches show that learning style is an important factor in determining self-regulated learning (Shaw and Marlow, 1999; Alharbi, Paul, Henskens, and Hannaford, 2011).

Learning style is an approach that explains how individuals learn or different ways used to concentrate and master difficult or new information through different perceptions. Each style is unique or personal; it differs from one individual to another. Thus, it can be assumed that learning style is closely related to personalities, beliefs, choices and behaviors implemented by individuals to help them learn in a conditioned situation.

James and Gardner (cited in Ghuftron and Risnawita, 2012) stated that although it is a complex method, student regards learning style as the most effective and efficient way in processing, storing and recollecting what they have learned. Merriam and Caffarella (1991) defined popular learning style in andragogy as "the characters of an individual that relate to the methods of processing information, feeling, and acting in learning situations". Keefe (1979) defined learning style as "cognitive, affective and physiological factors that present relatively stable indicators of how students feel, relate with others and react to the learning environment". Kolb (cited in Riding and Rayner, 2002) stated that learning style was the method used to collect information in order to make learning style an integral part of the active learning cycle. Kolb (1984) proposed that individuals selected their learning style based on the fastest and best method for each individual to absorb external information. In accordance with Kolb, several researches explained learning style as a consistent pattern of individuals when they accept, interact, absorb, store, organize, and process information (Gunawan, 2006; Susilo, 2006).

The various definitions stated previously described different perspectives of measuring learning styles. Cognitive and learning styles are the two commonly used terminologies on this subject. Cognitive style relates to the "form" of cognitive activities (thoughts, feelings, problem solving, etc.) and not the contents. Therefore, it was often considered as "ensuring dimensions" of personality, natural bipolarity, and periodical stability. On the other hand, learning style combined the cognitive aspect with affective and physiological styles.

Theories of learning styles develop very rapidly. One of the numerous theories of learning styles is the

personality model of the field-dependence and field-independence learning styles (Witkin, Oltman, Raskin, and Karp, 1971). An individual uses field-dependence learning style if he/she perceived himself as being under the influence of the environment. On the other hand, an individual is considered to use field-independence learning style if he perceives that the environment does not influence most of his behaviors.

According to Luk (1998), individuals with field-dependence learning style are those who are dependent on their social skills, attitude, perception, quality, feeling and are highly influenced by physical and social backgrounds. Individuals with this learning style tend to depend on others to obtain information, guidance, and maintaining their attitude. They tend to be extroverted and in constant need of stimulation and motivation from others and significant others around them (Witkin et al., 1971).

Conversely, individuals with field-independence learning style tend to be more analytical, logical, and capable of restructuring and describing all aspects of a problem. As a result, individuals with field-independence learning style are not overly affected by authority figures, social figures, external matters, and are more guided by their own needs. They tend to be introverted, have the will to perform their best (self-studying for example) without support from others around them, organized, focused and competitive. Individuals with field-independent personality have lower social orientation compared to individual with field dependent (Witkin et al., 1971). Witkin et al. also states that they like to learn with clear targets and work in their own schedule.

Based on the previous explanations, it can be concluded that self-regulation is an important element in the learning process. This study proposed to relate self-regulated learning pattern with learning style. The aim of this research is to test the theoretical model of field-dependent and field-independent learning styles impact on student with self-regulated learning.

Methods

Research Population and Samples

The population of this research was all 1795 students from the Faculty of Education in Islamic Studies at Islamic State College in Kudus. The sampling technique was random sampling, as this can ensure that any biases in the population could be equally spread between the research samples.

The numbers of samples need to comply with Krejcie and Morgan's table (cited in Key, 1997). Based on the table, a total of 317 samples were required for a population of 1800. The random sampling was conducted in SPSS program. SPSS was used to randomly mark 317 research respondent number. The marked respondents were selected to be participants of the research.

On the next phase of the research, the research team contacted and met the respondents in their respective classes. After verifying the collected data, there were 239 students who were qualified to be further analyzed. Data from 78 students were not included in further analysis, with 51 students being absent during data collection and 27 had invalid answers in their questionnaires.

The age range of the research samples was between 18 to 26 years old, with 96 male and 143 female research samples.

Research Instruments

Self-regulated learning is a proactive learning activity conducted through the individual's own motivation, meta-cognition and learning behavior. As stated by Zimmerman (1989), these variables were researched by using the self-regulated learning scale with motivation, meta-cognition and behavior dimensions. The scale consisted of 30 items, with 11 measuring the motivation dimension, 9 measuring the meta-cognition dimension, and 10 measuring the behavior dimension. Examples of the items were as follows: "If I plan something, I am quite confident that I am able to follow it through" (motivation dimension); "In order to produce good results, I determined every step of the planning" (meta-cognition dimension); "My biggest problem is having the difficulty in starting a college task" (behavior dimension). The reliability scores for each dimension were .89 (motivation dimension), .87 (meta-cognition dimension), and .89 (behavior dimension).

Field-dependence learning style is a particular stable patterns of individual's tendency when they obtain, interact, absorb, store, organize and how they view matters globally, create wide concept differences, show social orientation and determine goals and improvements. These variables were researched using the field-dependence learning style scale with components as stated by Witkin et al. (1971). The scale consisted of 28 items, with seven items measuring each dimensions. Examples of the items were as follows: "I do not mind reading or listening without understanding

Table 1
Model Testing Criteria

Criterion	Standard of Acceptance (for Models to be considered fit)
Chi-Square Significance (p)	> .05
RMSEA	< .05
GFI	.90
AGFI	.90
TLI or IFI	.95

Table 2
Descriptions of Research Data

	N	Mean	Standard Deviation
Field-Dependence	239	42.17	8.912
Field-Independence	239	32.41	10.116
Motivation	239	23.09	8.828
Meta-cognition	239	22.97	8.607
Behavior	239	15.9	3.835

every single word as long as I am able to obtain the main idea" (viewing matters globally dimension); "When I learn, I prefer simple and general materials" (creating wide concept differences dimension); "I enjoy learning together with friends" (showing social orientation dimension); "I need a calm atmosphere in order to be able to concentrate well" (determine goals and improvements dimension).

Individuals with field-independence learning style have the tendency to view matters analytically, formulate particular concept differences, show impersonal orientation, and possess self-designed goals. These variables were researched using the field-independence learning style scale with components stated by Witkin et al. (1971). The scale consisted of 26 items, with seven items measuring the 'viewing matters analytically' dimension, six items measuring the 'creating particular concept differences dimension, six items measuring the 'showing impersonal orientation' dimension, and seven items measuring the 'possessing self-designed goals' dimension. Examples of the items were as follows: "If I learn, I understand even the small details of the material" (viewing matters analytically dimension); "I must understand every word of what I listen to and read" (creating particular concept differences dimension); "I prefer to learn alone" (showing impersonal orientation dimension); "I finish a task the best I can before I

move on to other tasks" (possess self-designed goals dimension).

The field-dependence learning style scale resulted in the reliability score of .71 while the field-independence learning style scale resulted in the reliability score of .74 on the reliability test. Therefore, both learning style aspects possessed relatively good reliability (> .70), enough to pass the required reliability score.

Data Analysis Techniques

The data analysis in this research was conducted using the Structural Equation Models data analysis technique. This technique tested series of complicated correlations between one or several dependent variables with one or several independent variables simultaneously. Each variable could be in the form of a factor or a single variable that was directly observed or measured in a research process (Ferdinand, 2000). The Analysis of Moment Structures (AMOS) program was used for the analysis. Table 1 shows the criterion types and standards of acceptance, in determining whether or not the proposed models would fit.

Results

Descriptive data of each scale are presented before the model analysis. The descriptive data statistics are summarized in Table 2.

As shown in Table 2, the field-dependence variable had the empirical mean score of 42.17 with the standard deviation value of 8.912. The field-independence variable had the empirical mean score of 32.41 with the standard deviation score of 10.116. The motivation variable had the empirical mean score of 23.09 with the standard deviation score of 8.828. The meta-cognition variable had the empirical mean score of 22.97 with the standard deviation score of 8.607. The behavior variable had the empirical mean score of 15.9 with the standard deviation score of 3.835.

Results of the Confirmatory Factor Analysis and Hypothesis Test

According to Ghazali (2008), uni-dimensionality testing on each construct should be conducted with confirmatory factor analysis before conducting a structural equation model analysis. This was conducted in order to find out the reliability of the construct measuring indicators.

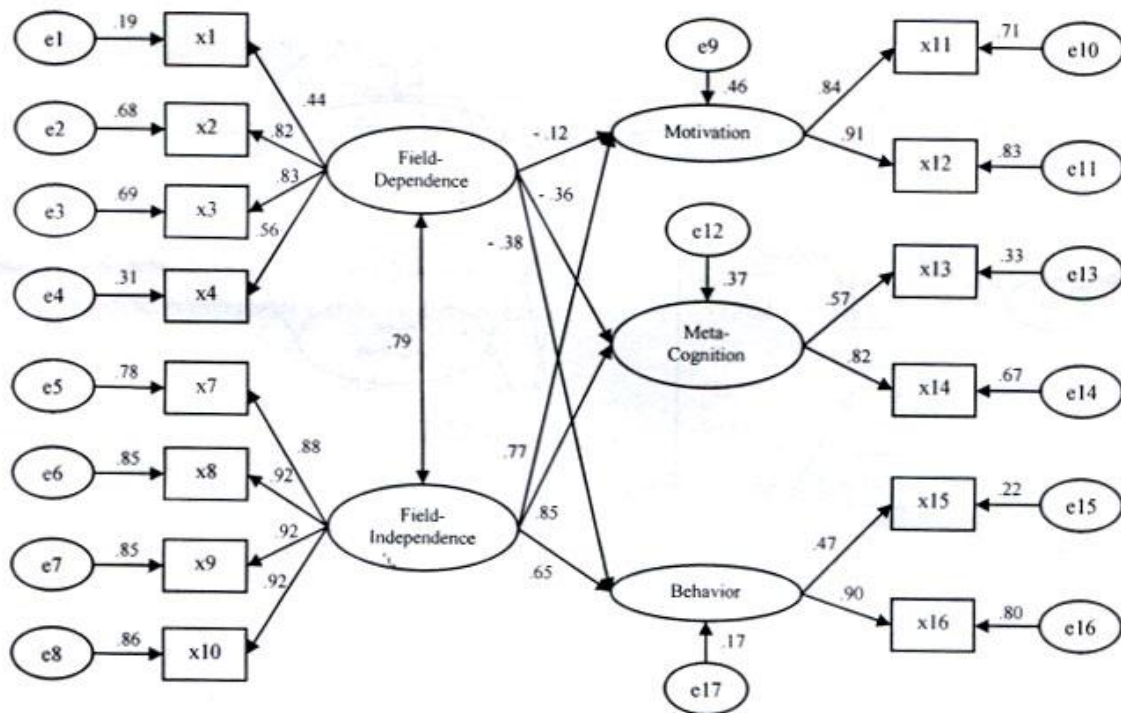


Figure 1. Model analysis result of the effects of field-dependence and field-independence learning style on students with self-regulated learning

The uni-dimensionality test in this research was conducted to identify the significance of discrimination power (item correlation with the total) of the construct indicator. It was also conducted to see the validity of the convergent variable or the loading factor score of each indicator.

Confirmatory analysis was conducted between the exogenous variables and the indigenous variables. The exogenous variables of this research were the learning style variable, consisting of field-dependent learning style and field-independent learning style. The other exogenous variable was the self-regulated learning, which consists of motivational, meta-cognition, and behavior dimensions.

Based on the results of the confirmatory analysis between the exogenous and indigenous variables, the fit criterion was well achieved. The significance scores of the standardized loading parameter estimations were also above the score of .05, meaning that the fit criterion was achieved as well.

The next step after determining that the proposed requirements were fulfilled was to test the hypothesis, by testing the theoretical data model with

the overall empirical data. Results are shown in Figure 1.

Based on the early structural model analysis, results showed that the *Chi-Square* = 114,186 (*DF* = 70, *p* = .001), *CMIN/DF* = 1.631, *GFI* = .938, *AGFI* = .907, *TLI* = .971 and *RMSEA* = .051. Model acceptance requirement criteria were fulfilled, except on the probability score (> .05). Hence, re-estimation was attempted.

Re-estimation of the research model was conducted through model modification. Model modification could be conducted as long as it did not deviate from the proposed theory and the fit mode that suit the empirical data was not yet found. Model modification could be conducted by modifying the direction of the correlation between variables in the model, by adding or reducing latent or observational variables as long as it was still in the model-supporting conceptual frame of the research.

Model modification analysis in this research was conducted by observing the output of the Modification Indices (MI) on the previous AMOS 16 analysis. Modification Indices output recommended that the

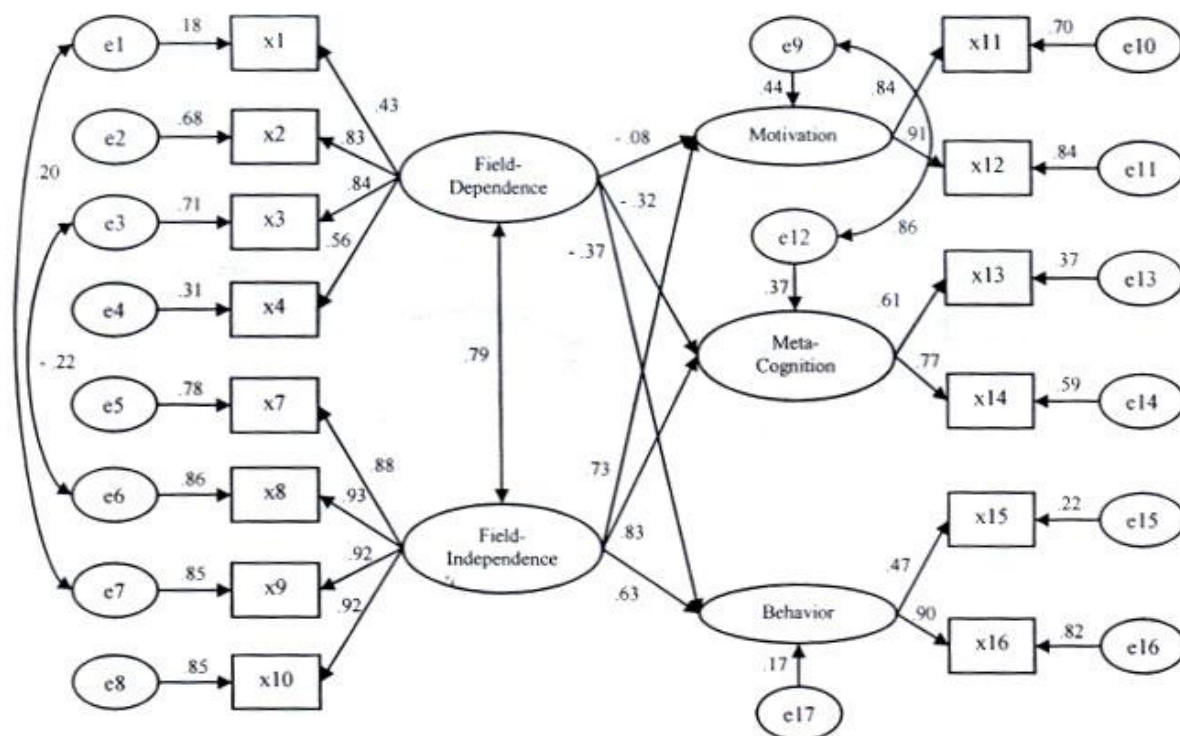


Figure 2. Modified model analysis result of the effects of field-dependence and field-independence learning style on students with self-regulated learning

error variables should be further processed in the modification by correlating e1 with e7, e3 with e6, and e9 with e12. The process of re-testing was conducted afterwards, with the results of the re-analysis as shown on Figure 2.

Based on the re-testing process, the criteria requirements were improved, the probability score increased from .001 to .037, the GFI score increased from .938 to .951, the AGFI score increased from .907 to .923, the TLI score increased from .971 to .985, and the RMSEA score decreased from .051 to .037, thus fulfilling the requirements. Hence the correlation model has improved (see Figure 2).

Results showed that the proposed model plan in Figure 2 was not significantly different than the empirical data. Researchers did not need to conduct a model modification, as the current model could be used in the research. These results also meant that the hypothesis stating that there was compatibility between the theoretical model and the empirical data is acceptable.

Loading factors estimation or lambda value that was the evaluation result of the regression quality between

latent variable and degree of freedom (df), C.R score or t-count (probability value significance of .05) could be determined after the analysis using AMOS statistic program. Results of the regression quality in the causality test are presented in Table 3.

The effects of exogenous variables (field-dependent learning style variable) on the three components self-regulated learning can be seen on Table 3: motivation ($r = -.084, p = .458$), meta-cognition ($r = -.321, p = .039$), and behavior ($r = -.371, p = .072$). While the effects of field-independence learning style on the three components of self-regulated learning are: motivation ($r = .728, p = .000$), meta-cognition ($r = .826, p = .000$), and behavior ($r = .629, p = .013$).

Based on the above analysis results, it could be concluded that the field-dependent learning style variable had a significant negative effect on the meta-cognition component. While the motivation and behavior components were not proven because the probability score of $> .05$. The field-independence learning style variable had a significant positive effect on the three components of self-regulated learning, which were motivation, meta-cognition, and behavior.

Tabel 3
Results of the Regression Quality Causality Test

	Estimate	S.E.	C.R.	P
Field-dependence learning style variable on behavior	-.371	.21	- 1.799	.072
Field-independence learning style variable on behavior	.629	.086	2.47	.013
Field-independence learning style variable on meta-cognition	.826	.181	5.076	.000
Field-dependence learning style variable on meta-cognition	-.321	.52	- 2.061	.039
Field-independence learning style variable on motivation	.728	.195	6.568	.000
Field-dependence learning style variable on motivation	-.084	.603	- .742	.458

Discussion

The aim of this research was to test the theoretical model of field-dependent and field-independent learning style impact on student with self-regulated learning, which consisted of motivation, meta-cognition, and behavior.

Based on the analysis results of the research, it was found that field-dependent learning style had a significant negative effect on meta-cognition component of self-regulated learning. Individuals with field-dependent learning style were very dependent on the environment, extroverted, and they required stimulation and motivation from other individuals and the significant others in their lives (Witkin et al., 1971; Ghufon and Risnawita, 2012). Consequently they lacked on meta-cognition use in self-regulation and in selecting, utilizing or creating the environment that can support their activities.

The analysis results also showed that the field-independent learning style had a significant positive effect on the three components of self-regulated learning, which were motivation, meta-cognition, and behavior. This result was caused by the fact that individuals with field-independent learning style are introverted, organized, focused, competitive and they do not need others to motivate/encourage them (Witkin et al., 1971; Ghufon and Risnawita, 2012). Individuals with field-independent learning style learn with clear goals and study on their own schedule (Witkin et al., 1971; Ghufon and Risnawita, 2012). Hence they are more planned, organized and have a high discipline in their learning process.

Research results showed that the differences of abilities in self-regulated learning were affected by

different learning styles (Shaw and Marlow, 1999; Alharbi, Paul, Henskens, and Hannaford, 2011) and meta-cognitive strategy (Shannon, 2008). Specifically, results of Vermunt's (1992) research explained that individuals with internal self-regulation in learning were capable of setting clear goals, organized and do not require guidance or instruction from others in choosing their learning or problem-solving strategy. In contrary, individuals that depended on others were unable to set clear goals and learn only to complete tasks or because of instruction from others. Cassidy's (2012) research stated that learning style, self-evaluation, and academic self-control affected self-regulated learning strategies.

The results also enhanced Goodarzi and Mirhashemi's (2013) research that tested the role of field-dependent and field-independent cognitive learning style, difference of learning styles with self-regulated learning strategy, management source, help-seeking, learning partner, regulation effort and meta-cognitive strategy on 170 students of Faculty of Psychology at Islamic Azad's Azadzar University in Iran. Goodarzi and Mirhashemi's (2013) research analysis results showed that field-dependent and field-independent cognitive learning style had a significant effect on self-regulated learning strategy, management source, learning partner, regulation effort and meta-cognitive strategy.

Conclusion

Self-regulated learning is very important in the learning process because it can help individuals to create better learning habits, improve learning abilities, implement learning strategies to improve academic achievements, observe performance and visualizing the evaluation of academic improvement.

This research proved that the learning abilities of students with self-regulated learning were influenced by the uniqueness of each student's learning styles, field-dependence and field-independence.

There were several weaknesses in this research. The measurement of the self-regulated learning construct was not specified on a particular learning subject. The research samples were only students of the Department of Education and the total number of participants was not in accordance with the required based on the calculation table because 25% of the total participants were eliminated. There were several advices from the researcher for future researches. Firstly, focus the self-regulated learning construct on a particular learning subject, secondly, use samples from various departments, not just samples from a particular department. Thirdly, use at least 125% of the required samples based on the calculation table to ensure that the minimum sample total requirement would be fulfilled even with possible elimination. The data collection period could also be increased, into 2-3 weeks, for example. Hence it allowed more time to contact the respondents and reduce elimination. Alternatively, contact the respondents directly to ensure their participation. Lastly, possible need for assistants in the data collection process to ensure the completeness and accuracy of the respondents' data.

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