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Dominant Factor Analysis of Independent Learning as a Key Success Factors of Student Learning

Mawardi[1], Agustin, Atalya[2]

[1](Faculty of Education/ Satya Wacana Christian University, Indonesia)
[2](Faculty of Education/ Universitas Pelita Harapan, Indonesia)

ABSTRACT: This research aims to identify the dominant factors of independent learning that contribute to the success of student learning of Primary Teacher Training Distance Learning program and to determine the differences of the success between female and male students. This study was designed based on a quantitative approach. The research subject was the Primary Teacher Training students in Distance Learning program as elementary school teachers. This research used test to measure student learning outcomes and rubric scale of independent learning. The analysis used the Chi Square and ANCOVA technique to check the mean rank and the role of independent learning as a moderator variable of student learning outcome based on gender. The results show that the two dominant factors are prior knowledge provision factor (mean rank = 3.41) and active learning factor (mean rank = 2.74); Other results show that there is a difference of the learning success between female and male students, which is moderated by independent learning. This conclusion is based on the average scores of male (62.4), which is lower than the female's (78.2). The significance of this conclusion was supported by ANCOVA test results on gender variant, where the calculated F value is 15.77 with significance of 0,000. The 0.000 value is smaller than $\alpha = 0.050$. This means that there is a significant difference between female and male students students' learning achievement, which is moderated by independent learning.

Keywords -*Independent learning, Learning outcomes*

I.   INTRODUCTION

Ministry of Education and Culture Indonesia stated that until 2019 there is still 21% primary teachers have not fulfilled undergraduate degree qualification. A further significant step needs to be taken for this. It will take a groundbreaking model of acceleration of an adequate education. Alternative solution offered in the administration of undergraduate education that allows teachers to have a greater opportunity to not interfere with the duties and responsibilities is the Distance Learning (DL) program. DL program uses dual mode approach, namely through the integration of conventional learning system (face to face on campus) and a self-regulated learning, supported using multimedia. The essential difference between DL program and regular program is essentially contained in the implementation or in the learning process. The learning process in DL program is implemented through the integration of face to face lectures on campus or/and mediated lectures by self-learning activities.

Based on the description of the DL program, it is obvious that the emphasis of lectures at DL program is in the independent learning using distance learning media. Lecture model using e-Learning with independent tasks is one of the theoretical models which is deemed relevant. Roddy, et. all (2017) mentioned that key success for online learning are proficient improvement in teaching and learning instruction and technology for teacher as well as technology mastery, rapport, and independent learning for students. Independent learning is a condition where students learn to plan, manage, control themselves and reflect on their own learning process to achieve a certain competency. Serdyukova and Serdyukov (2013) stated that independency in learning is directly related to novelty, creativeness, and self-belief. Meanwhile, Mudjiman (2011: 9) defined independent learning is the condition of active learning activities, which is driven by the intention or motive to master a competency in order to overcome a problem, and is built with knowledge or competency that has been held.

Based on the nature of independent learning and rules of DL program, which are distance learning and self-instruction, it appears that theoretically successful achievement of learning outcomes is determined by the condition of the student learning independence. Therefore, it is very important to monitor the condition of student learning independence. There are various studies on the contribution of independent learning towards the student learning outcomes. For example, the research of Jaleel & O.M (2017) which is said that there was important positive correlation between student success in Information Technology and Self-Directed Learning (SDL) of Students at Secondary Level. It means that the students who have high levels of self-learning readiness

will reach high achievement as well, and vice versa. Slater, Cusick, Louie (2017) females had better SDLR scales than males. SDLRS (Self-Directed Learning Readiness Scale) scores were significantly greater for females (215.53 ± 25.46) than for males (209.11 ± 23.19), t(405) = 2.62, p = 0.009, d = 0.264. An interesting phenomenon related to the relation between student learning independence and the competency of learning outcomes is gender factor.

The experiences of researchers and the prior studies discovered the phenomenon that the average level of independent learning reached 51%. This value is obtained from the average of submitting online tutorial tasks via e-mail or flexible learning portal in accordance timing. The low condition of independent learning impacts on the attainment of learning outcomes. The recapitulation result of student competency has shown that the mean score is 58. Observing the various results of researches on the condition of independent learning and achievement of learning outcomes, also the phenomenon of gender factor that influenced by independent learning itself and its contribution to the achievement of learning outcomes, then it becomes an obligation for lecturers to monitor students' condition. The mapping of the condition of student independence learning can be used for external guidance and encouragement so that the condition can be improved.

1.1. THE NATURE OF DISTANCE LEARNING PROGRAM

DL program is essentially an education organizing program, specifically designed for teacher's in-service. The program is implemented by the education institution who has been granted a permission. DL program uses dual mode approach, namely through the integration of conventional learning system (face to face on campus) and a self-regulated learning, supported by the use of multimedia.

The curriculum used in DL program is applicable curriculum at each college organizers. Graduates Competency Standards is the reference curriculum refers to the Decree of the Minister of Republic of Indonesia Number 16 in 2007 about Academic Qualification Standards and Teacher Competency, which includes four core competencies, namely: pedagogical competency, personal competency, social competency, and professional competency. In the implementation, DL program curriculum is appropriately designed, so that a group of subjects can be implemented by face to face learning activities and other groups in self-learning activities (self-instruction), either with or without tutorials. Determination of the groups based on the consideration of a requirement of practice/lab work or other subject which must be conducted through face to face learning activities.

The determination of the groups of subjects through independent learning with tutorial services is that the subjects demand high-level thinking skills and for professional competency development. Determination of the groups through independent learning without tutorials based on the consideration that the course can be studied independently by students, either individually or in groups.

1.2. STUDENT LEARNING INDEPENDENCE

Mudjiman (2011: 9) gave explanation that independent learning is an active learning, which is driven by the intention or motive to master a competency in order to overcome a problem, and is built with knowledge or competency that has been held. Meanwhile, Jaleel & O.M (2017) stated that Self-Directed Learning (SDL) approach improves the motivation of students to learn, since they are the creators of their own knowledge. To sum up, Geng, Lau, Niu (2019) summarized that SDL is students' proficiency to direct themselves in learning, completing task, and solve problems.

From the concept of independent learning, it can be observed that there are four components of the concept and also the anatomy of the concept. The components are: a) active learning activity; a learning activity which has student activeness, persistence, purpose and creativity to achieve objectives; b) the motives or intentions, which are the driving force of intensive, persistent, purposeful and creative learning to achieve competencies; c) competency, which is knowledge, skills and attitudes that can be used to solve problems; d) constructivism, is the prior knowledge provision that has been owned by the learner, can be used to process information, so they will become new knowledge or skills.

As a teacher, how can we detect the level of student learning independence? Is the level can be used to predict the student learning outcomes? The answer is to develop the rubric instruments of independent learning assessment. The instrument is developed based on the components above. The scores through the scoring rubric determine the level of student learning independence, which are high or low. Various studies in international scientific journals found that the level of student learning independence is important in the achievement of student learning competencies. (Usta, 2011; & Umar, 2011; WenyHulukati, 2011; Jaleel & O.M, 2017).

1.3. RELATION BETWEEN INDEPENDENT LEARNING AND THE COMPETENCY OF STUDENT LEARNING OUTCOMES

Student learning Independence as a learning strategy is the impact of debriefing the students to develop their competencies, according to Mudjiman (2011: 198), the steps are: 1) establish the core competency to

overcome the current problems. The main competency is the main goal set by the learners; 2) Establish the urgency of the problem and the competency; 3) Develop plans to hold competency. These measures include a) define the intermediate objectives. Competencies among these are the goals of independent learning is defined solely by the learners, b) identify the goals of intermediate objectives, which has been owned and objectives between the need to set to be achieved; 4) Carry out self-learning plan, with a target of achieving the goals between through several cycles / business; and 5) To evaluate the achievement of objectives between the intermediate objectives and the main objectives. Step number 4, which is implementing independent learning plan seems to be a main factor in contributing to the achievement of student learning competencies. The main factor components include: 1) the motivation or intention to learn. A high learning motivation is able to encourage the students to learn consistently and persistently (Mudjiman, 2011). Consistent means learning constantly according to the schedules. Persistent means durable in learning, not easily saturated. 2) the intention to control or have specific competencies as learning objective. Learning competency is a requirement that must be fulfilled. If learning is a requirement, then the encouragement of learning will be stronger. 3) Perform active learning activities to achieve competencies.

Mudjiman (2011) mentioned that the activity of learning shown by various indicators, which are learning in a planned, goal-oriented, creative and innovative in learning, doing follow-up study clearly, always monitoring the learning outcomes, always control the behavior so it will not disrupt the concentration in learning, also realize that the competencies will be useful forever. 4) Armed with the competence they have (constructivism). Students associate the new knowledge or competencies with the competencies they already have.

The analysis of the contribution of independent learning above increases the competency of student learning outcomes. It is consistent with the research by Geng, Lau, Niu (2019) which stated that students' skills to direct themselves in learning and to operate learning technologies can impact student learning effectiveness. It means that the students who have high levels of self-learning readiness will reach high achievement as well, and vice versa. It is also consistent with other findings i.e. Hui & Umar (2011); Wenny Hulukati (2011); Jaleel & O.M, 2017)

Besides the various studies mentioned above, some of the following researches can strengthen the theory of the role of independent learning in achieving successful learning of the students, especially the design of online-based independent learning strategy (Jezegou, 2012). These findings are different from the research conducted by Kohen &Kramarski (2012) which found that student self-motivation factor determines the effectiveness of learning. The increasing motivation is done by structuring the sources of inspiration. As guides, teachers can design the learning content that contains failed or successful experiences of famous people as a source of inspiration. Brackett believed that it can motivate and encourage our students to learn.

An interesting phenomenon related to the relation between student learning independence and the competency of learning outcomes is gender factor. The results of various studies found that there are significant differences between men and women related to the level of SDLRS (Slater, Cusick, Louie, 2017).

II.   METHOD

This study was designed based on a quantitative approach. In terms of the types of methods, it belongs to the type of survey research. In terms of the level of their explanations, it is a descriptive study. The subject of the study was the Primary Teacher Training students in Distance Learning program as elementary school teachers, came from Bandar, Subah, Batang, and Limpung. The research sample was determined at 34 students purposively.

Data collection instrument used a rubric scale of independent learning and document study of student grades. The instruments of the rubric consisted of 30 items with a score range between 1 and 3 according to the student answers. They have been tested and the reliability coefficient was $\square$ 0.831. All the rubric items showed that the Corrected Item-Total Correlation coefficient was greater than the minimal value of product moment correlation coefficient (0.300) at a significance level of 5%. Student achievement data obtained by document study of student grades of DL program in Batang.

Data were analyzed using Chi-Square analysis techniques (Friedman Test) to see the mean rank factors of student learning independence. ANCOVA test was then performed to examine the role of independent learning as a moderator variable learning achievement of students based on gender. The tests using ANCOVA technique began first with the prerequisite tests, which were data normality test and data homogeneity test.

III.   FINDINGS

Below are the result of the research:
3.1. Data Description of Independence Level and Student Learning Outcomes
The frequency distribution of student learning independence measurement results are summarized in Table 1.

Table 1.Frequency distribution of student learning independence

No	Category	Interval	Learning Independence f	Learning Independence %	Learning Outcome f	Learning Outcome %
1	Verry High	≥ 90	0	0%	15	44,1%
1	Verry High	80 - 89	13	38,2%	9	26,5%
2	High	70 -79	16	47,1%	6	17,6%
2	High	60 - 69	3	8,8%	2	5,9%
3	Moderate	50 - 59	2	5,9%	2	5,9%
3	Moderate	40 - 49	0	0%	0	0%
4	Low	30 - 39	0	0%	0	0%
4	Low	20 - 29	0	0%	0	0%
5	Verry Low	10 - 19	0	0%	0	0%
5	Verry Low	< 10	0	0%	0	0%
		Total	34	100%	34	100%
Average				75,94		82,88

Table 1 provides information that variability scores of student learning outcomes are more heterogeneous than the scores of students learning independence. On the measurement of learning independence, two students (5.9%) had scores between 50-59, which were in the middle category. There were three students (8.8%) obtained scores between 60-69 and were located at high category. There were 16 students (47.1%) received scores of 70-79 at high category, and 13 students (38.2%) obtained scores between 80-89, which were at very high category.

On the measurement of learning outcomes, there were four students (11.1%) obtained scores between 60-69, 25 students (69.4%) obtained scores of 70-79, and 7 students (19.5%) received 80-89. These meant that there was an increase of 19.5% students who received scores at very high category, which was not found in the first measurement.

3.2. Result of Dominant Factor Analysis of Student Learning Independence

Independence level data of student learning as described above, then be itemized by the data of each component/factors, which are goal oriented, active learning, self-motivation, and the prior knowledge provision. Table 2 describes the data description of the factors of student learning independence.

Table 2. Frequency distribution of student learning independence factors

Category	Self-motivation Int.	f	%	Goal oriented Int.	f	%	Active learning Int.	f	%	Prior knowledge provision Int.	f	%
VH	> 20	4	11,8	> 11	0	0	> 41	0	0	> 5	19	55,9
H	18 -20	14	41,2	10 -11	22	64,7	36 - 41	23	67,6	5	10	29,4
M	15 -17	11	32,4	8 -9	8	23,5	30 - 35	6	17,6	4	3	8,8
L	12 -14	5	14,7	6 - 7	4	11,8	24 - 29	4	11,8	3	1	2,9
VL	< 12	0	0	< 5	0	0	< 24	1	2,9	< 3	1	2,9
Σ		34	100		34	100		34	100		34	100

VH = Verry High, H = High, M= Moderate, L = Low, and VL = Verry Low

Table 2 provides information that in self-motivation factor, there were 18 (4 + 14) students (53%) which had high self-motivation and very high achievement in learning, 11 students (32.4%) were self-motivated enough, and five students had low self-motivation.

In goal-oriented factor, none of the students (0%) had orientation on achievement of goals at very high category. There were 22 students (64.7%) had high orientations. 8 students (23.5%) had middle orientation and 4 students (11.8%) had low orientation.

In the active learning factor, none of the students (0%) had very high activity of learning. There were 23 students (67.6%) had high activity of learning. 6 students (17.6%) had learning activeness at middle category, 4 students (11.8%) had low activity of learning in class, and a student (2.9%) who had a very low activity of learning.

In the prior knowledge provision factor, mostly students, 29 (19 + 10) people (85.3%), claimed to have knowledge provision at very high category and high in solving the problems. There were three students

(8.8%) who had high activity of learning. There were 6 students (17.6%) who had knowledge provision at middle category, 1 student (2.9%) had knowledge provision at low category, and 1 student (2.9%) had prior knowledge provision at very low category.

Furthermore, the results of Chi-Square (Table 3) show that the prior knowledge provision factor (F4) is the most dominant factor. Followed by active learning factor (F2), self-motivation factor and goal-oriented factor.

Table 3. Mean rank of student learning independence factors

Faktor	*Mean Rank*
Goal oriented (F1)	1,84
Active learning (F2)	2,74
Self-motivation (F3)	2,01
Prior knowledge provision (F4)	3,41

Test Statistics

N	34
Chi-Square	3,606
Df	3
Asymp. Sig.	,000

AFriedman Test

3.3.The Data of the Learning Outcomes Dif-ferences between Men and Women, moder-ated by independent learning

Summary of ANCOVA test as shown in Table 4, provides information about the F value and its significance. At the variant of corrected model, it appears that the F value is 35.503 with a significance level of 0.000. Since $0,000 < \alpha = 0.050$, then the influence of the independent variable on the dependent variable is significant. It means that DL program together with independent learning simultaneously have a significant impact in student learning outcomes.

Table 4. The ANCOVA test

Tests of Between-Subjects Effects

Dependent Variable: skor_belajar

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3250,429(a)	2	1625,214	35,503	,000
Intercept	269,362	1	269,362	5,884	,021
skor_bm	127,148	1	127,148	2,778	,106
jeniskelamin	722,183	1	722,183	15,776	,000
Error	1419,101	31	45,777		
Total	238232,000	34			
Corrected Total	4669,529	33			

a R Squared = ,696 (Adjusted R Squared = ,676)

In the learning independence variant (skor_bm), the F value is 2.778 with a significance value of 0.106. Since the value 0.106 is much greater than $\alpha = 0.050$, the F value is not significant. This means that there is no difference between the level of learning independence partially and learning outcomes.

In gender variant, the F value is 15.77 with a significance value of 0,000. It is significant since 0,000 is smaller than α = 0.050. This means that there is a significant difference between gender and learning outcomes. Besides, the results also provide information about the linear relation between learning independence as a covariate variable and learning outcomes as the independent variable.

IV.   DISCUSSION

Based on Table 1, the average of student learning independence is at high category (75.94), meanwhile the average level of student learning outcomes is at very high category (82.88). They indicate the success of the DL program. Furthermore, the ANCOVA test result in the R Squared (Table 4) shows that the coefficient of Adjusted R Squared reached 0.676. The figure explains that the contribution of independent learning variable in explaining the variance of learning outcome variable studied is 67,6%. It means that 67.6% of learning outcomes is from independent learning, while 32.4% is from the contribution of other variables.

Independent learning which has an impact on student learning outcomes is a finding that self-learning model is effective to achieve their learning competencies. This finding is consistent with the model of instructional design Dick, Carey & Carey (2014), which essentially is a model for the improvement of learning. It is also consistent with the research by Jaleel & O.M (2017) which is said that there was important positive correlation between student success in Information Technology and Self-Directed Learning (SDL) of Students at Secondary Level. It means that the students who have high levels of self-learning readiness will reach high GPA as well, and vice versa.Although not the focus of this study, the model of distance learning program provides attendant impact of student learning independence. It is consistent with the findings of the study of Usta (2011)

Based on the concept of distance learning, its effectiveness is relevant to the researches by Jezegou (2012) who found that the model of distance learning is effective to express the student learning independence. Appearance of independent learning as a result of DL model described in a research by Kohen &Kramarski (2012) which stated that the DL model can bring independent learning of teacher candidates.

4.1. Dominant Factors of Independent Learning

Chi-Square test results explain that the two dominant factors of independent learning which establish the success factor are the prior knowledge provision (mean rank = 3.41) and active learning factor (mean rank = 2.74). Other factors are self-motivated factor (mean rank = 2.01), and goal-oriented factor (mean rank = 1.84).

The finding which stated that the prior knowledge is important for education is consistent with the research by Dagar& Yadav (2016) who stated that the core of education should be changed from putting content in students' knowledge construction but rather in knowledge production. On the contrary, Mudjiman (2011: 198) stated that the main success factor in learning is self-motivation.

The finding about the prior knowledge provision   as a dominant factor is also in contrast with the research by Xuan, Razali, Samad (2018) whose finding stated that the foundational attribute of SDLR is motivation. This is proven by the highest mean score of motivation which is 4.57. This can mean that students have perseverance to face challenges in fulfilling academic responsibilities.

4.2. The Differences of Independence and Student Learning Outcomes between Men and Women

The ANCOVA test results as given in Table 6, provide information about the F value and its significance. In gender variant, the F value is 15.77 with a significance value of 0,000. It is significant since 0,000 is smaller than α = 0.050. This means that there is a significant difference between gender and student learning outcomes. The research by Slater, Cusick, Louie (2017) showed thT females had better SDLR scales than males. SDLRS (Self-Directed Learning Readiness Scale) scores were significantly greater for females (215.53 ± 25.46) than for males (209.11 ± 23.19), t(405) = 2.62, p = 0.009, d = 0.264. On the other hand, it is contrast with the research by Mawardi, Mudjiman, Anitah and Asrowi (2014), which found that there are no significant differences between men and women related to independent learning.

V.   CONCLUSION

Based on the researches and discussion, it can be concluded that: 1) there are two dominant factors of independent learning of the Primary Teacher Training students in DL program which establish the success factor, there are the prior knowledge provision (mean rank = 3.41) and active learning (mean rank = 2.74); 2) there is a difference of the learning success between female and male students, which is moderated by independent learning. These conclusions are based on average results of men (62.4) which is lower than the women's (78.2). The significance of this conclusion is supported by ANCOVA test results on gender variant, as the F value of 15.77 with a significance value of 0,000. The value of 0.000 is lower than α = 0.050 which means F value is significant. This indicates that there is a difference of the learning success between female and male students, moderated by independent learning.

REFERENCES

[1]   Roddy C, Amiet DL, Chung J, Holt C, Shaw L, McKenzie S, Garivaldis F, Lodge J.M and Mundy M.E.Applying Best Practice Online Learning, Teaching, and Support to Intensive Online Environments: An Integrative Review. *Front. Educ.* 2017, 2:59.

[2]   Serdyukova, N. & Serdyukov, P,*Student autonomy in online learning, Proc. 5th International Conference on Computer Supported Education (CSEDU-2013),*2013, 229-233.

[3]   Mudjiman, Haris, *Belajarmandiri: pembekalan dan penerapan* (Surakarta: UniversitasSebelasMaret Press, 2011).

[4]   Jaleel, Sajna& O.M., Anuroofa. A Study on the Relationship between Self Directed Learning and Achievement in Information Technology of Students at Secondary Level. *Universal Journal of Educational Research*, 5(10), 2017, 1849-1852.

[5]   Slater et al. Explaining variance in self-directed learning readiness of first year students in health professional programs. *BMC Medical Education*, 2017, 17:207.

[6]   Geng, Shuang, Lau, Kris. M.Y, &Niu, Ben. Investigating self-directed learning and technology readiness in blending learning environment. *International Journal of Educational Technology in Higher Education*, 2019, 16:17.

[7]   Usta, Ertuğrul. The Examination Of Online Self-Regulated Learning Skills In Web-Based Learning Environments In Terms Of Different Variables.TOJET: *The Turkish Online Journal of Educational Technology 2011, 10* (3).

[8]   Hui, Tie. H., & Umar, Irfan Naufal. Does A Combination Of Metaphor And Pairing Activity Help Programming Performance Of Students With Different Selfregulated Learning Level?. *TOJET: The Turkish Online Journal of Educational Technology, 2011, 10 (4)*.

[9]   Wenny Hulukati.Pengembangan Model Bahan Belajar Mandiri Berbasis Andragogi Untuk Meningkatkan Kompetensi Pendidik Anak Usia Dini. *Jurnal Penelitian dan Pendidikan, 8 (1), 2011,* 88 -102.

[10] Jezegou, A. Towards a distance learning environment that supports learner self-direction: The model of presence. *International Journal of Self-Directed Learning, 9*(1), 2012, 11-23.

[11] Kohen, B., & Kramarski, B. Developing Self-Regulation by Using Reflective Support in a Video-Digital Microteaching Environment. *Journal of Education Research International, 2012*, 42 – 51.

[12] Dick, Walter; Carey, Lou   & Carey, James .O, *The systematic design of instruction: eight edition* (Upper Saddle River, N.J : Pearson Education, Inc, 2014).

[13] Dagar V, Yadav A. Constructivism: A Paradigm for Teaching and Learning. *Arts and Social Sciences Journal, 2016,* 7(4): 200.

[14] Xuan, Lim Ying, Razali, Abu Bakar, & Samad, Arshad Abd. Self-Directed Learning Readiness (SDLR) among Foundation Students from High and Low Proficiency Levels to Learn English Language. *Malaysian Journal of Learning and Instruction*: 15 (2), 2018, 55-8.

[15] Mawardi, Mudjiman, Anitah, Sri dan Asrowi. (2014). The Model of Instructional Design Based on Self-Regulated Learning Using Moodle. *Journal of Education and Practice. 5 (22),*2014, 131 – 140.