

# Development of Measurement Model Construct Student Persistence of the Open Learning University (UT)

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**Abstract** – This study was conducted to build the measurement model constructs UT student persistence by using structural equation modeling (SEM). There are two reasons, first their level of UT student persistence is very low. Second, student persistence can be defined by many things and is very complex, particularly for distance education student persistence. From the results of the study of existing literature, student persistence construct contains three dimensions: the dimensions of goal commitment, academic integration, and social integration. Then developed items that are used to build the model's baseline measurement of student persistence constructs. This study uses empirical data derived from 1876 students of UT and the second order confirmatory factor analysis obtained some value statistical goodness of fit is still not fit ( $\chi^2=752.748$ ;  $p=0.000$ ;  $GFI=0.932$ ;  $AGFI=0.909$ ;  $TLI=0.589$ ; and  $RMSEA= 0.059$ ). With the assistance of modification indices contained in the package IBM SPSS AMOS, the model has been modified twice. The last measurement model of student persistence construct has a statistical value  $\chi^2=83.803$ ;  $p=0.001$ ;  $GFI=0.991$ ;  $AGFI=0.982$ ;  $TLI=0.939$ ; and  $RMSEA=0.020$ . By using the existing empirical data, the dimensions of goal commitment, the dimension of academic integration, and social integration are significant dimensions in the measurement model UT student persistence construct.

**Keywords:** *persistence, goal commitment, academic integration, social integration, distance education, measurement model, cfa, sem, goodness of fit*

## I. INTRODUCTION

The Open Learning University (UT) is different from other ordinary college, because UT implementing distance education system (ODL) and the system of openness [1]. System of distance education implies that the learning process is not limited by space, time, and particular media. To conduct learning activities, UT students do not need to come to a place or particular room, and also do not have to learn at a particular time. UT students can learn wherever they are, and at the time whenever he wants. They can learn in accordance chance they had. How to learn they are not done face to face but using multimedia, both printed material (learning modules) and non-printed material (audio/video, radio/TV, computer/internet, and other media).

Open systems (openness) implies the existence of a very high flexibility of learning for students or prospective students. Anytime, they can register as UT students, without any age limit, year diploma, learning time, time registration, subjects were registered, the frequency of exams, and so forth. In fact they may withdraw from UT any time. If they want to sign up again, all subjects who've taken and passed still be calculated in credits. UT does not require any in recruiting students. To become a UT student is minimal of prospective students have completed secondary education (high school or its equivalent). The logical consequence of the nature of the UT implementing distance education system (ODL) and open systems (openness), it is a very high rate of students who did not re-register or dropped out.

Although the UT system does not recognize the system of "dropping out", the number of UT students who do not re-register recorded quite high which is approximately two-thirds. UT students who do not re-register is not expressed as a student dropouts. Nevertheless, if the UT students do not re-register for four consecutive registration period, then they are declared as inactive students or passive students [2, 3, 4, 5]. The high number of UT students who do not re-register it, reflecting the low persistence of UT students learning.

The low resistance student learning in distance education compared to face to face education, according to Belawati [6, 7], will become a major issue in the distance education system (ODL) for two reasons. The first reason is distance education offers alternative learning methods to overcome the constraints of time, economics, and demographics. Strength of this alternative learning methods mainly lies in their flexibility characteristics, transparency, openness, and cost-effectiveness. With these characteristics of distance education institutions provide vast opportunities for everyone, who for various reasons their limitations, and do not reach the regular higher education institutions. With these reasons, they have the perception that higher distance education becomes a second choice educational institution.

The second reason to pay more attention to the low level of resistance of learning in distance education, is having a great influence in the operations of the distance education institutions. The management of distance education institutions become inefficient and failed to become a provider of higher education with a large students capacity.

In general, this paper wants to build a measurement model of UT student learning persistence constructs by using structural equation modeling (SEM). To develop persistence constructs in this study, should be reviewed in advance understanding of the persistence operationally and dimensions that make up the construct.

## II. PERSISTENCE DEFINITION

In general, the persistence of student learning can be defined as the durability of a student in the education program at an institution that implements a certain system. Other terms that are often used for a similar purpose with persistence is durability, resistance, retention, attrition, completion rate, course completion, and dropout. Understanding the persistence of learning in an educational system is also often interpreted as "pass" or "fail" of an educational program [3, 8, 9, 10, 11, 12, 13].

Many factors can influence the persistence of a student's learning. Enlarged students are passive, not only means imply a further weakening of durability (persistence) of students learning, but also provide an indication of something that do not fit or are not suitable for students. The emergence of a mismatch is determined by many factors. This mismatch is not only influenced by internal factors of students, but is also influenced by environmental student factors, and institutional factors where they studied. For example, the services provided by UT institutions can affect students in continuing studies.

The persistence of student learning in the distance education system is a very complex phenomenon, because it is determined by various factors that influence each other [7, 10, 12, 14]. By adopting a model which has been developed by Tinto [15], and a study conducted by Sweet [12] says that the persistence of student learning Open Learning Institute (OLI) Canada is determined by four sets of main variables, namely: (1) the characteristics of student background, (2) the integration of academic, (3) social integration, and (4) the orientation attitude. As a criterion variable is the persistence of OLI student learning, as indicated by the level of completion of the course (course completion).

Consistent with studies conducted by Sweet [12], a study by Kember [14] has also adopted and adapted the models from Tinto [15] and Spady [16] to analyze the persistence model of student learning ODL system. He states that the students' learning persistence can be expressed by dropping out of college and completing the course (course completion) [14]. According to Kember [14] dropped out of the distance education system is determined by many factors interrelated and highly complex. Framework of the models of dropping out of college or the persistence of student learning is the result of the combined effect of the four main variables (four stages). The first main variable in the Kember model is learner characteristics (student characteristics), including ethnicity, gender, family background, home, work, and education. The second major variable is the commitment to the goal (goal commitment), including intrinsic and extrinsic goal. The third major variable is the environment of academic and nonacademic student (academic and social environment), and the fourth main variable is the integration of academic and nonacademic (academic and social integration).

Based on cultural factors, institutional, educational and background UT student, studies to assess the effectiveness of interventions to improve student persistence at UT has been done by Belawati [6]. Intervention is given to preparing students to be familiar with self-learning system and improve service to students who have the time and resource constraints. There are five kinds of interventions are being tested to see the effect on student persistence, namely (1) a welcome letter and written instructions (welcome), (2) a schedule reminders (reminders), (3) a letter of encouragement (encouragement), (4) a brochure about learning strategies independent (brochure), and (5) a list of names and addresses of students of the region UPBJJ (peers). Experiments in the field involve new students in 1102 than 8981 regular program (Science, FEKON, and Social) that register until September 1993. The variable persistence is measured

by (1) Independent Task collection rate, (2) the presence of the test, and (3) the level of re-registration of the second semester.

The results showed that the intervention was not significantly increase student persistence. Variable number of courses and employment status seems a little more influence persistence than the interventions. Another result is that the collection rate student Independent Task high and also high levels of participation test, it seems faster to re-register the second semester. Interventions are still not able to accommodate the needs of students who used the direct guidance [6].

The possibility that a student completes his education through UT can be achieved either continuously or intermittently re-registration between the registration period (semester) to complete his education at UT. Nevertheless, in the management or administration UT guidelines stated that when a student at least four times the continuous registration period (semesters) did not re-register, then the student is declared as a passive student. They will be treated as a new student with student registration number (NIM) new registration if they do come back. Although initially a passive student, according to a regulatory filing the number of courses or credits that have been taken and passed still recognized by UT and will be taken into account in the acquisition of cumulative semester credits [5, 17].

The whole terms related to student learning persistence giving the impression that there is a group of students who continually able to survive and finish their education. On the other hand, there are groups of students who falter in completing their education. One characteristic of education completion at a distance education institutions is by registering or connecting from one semester to the next semester.

The persistence of student learning in distance education is a complex phenomenon and determined many interrelated variables. The persistence regarding the psychological aspect which is a function of the interaction of individual, academic, and environmental [6, 7, 12, 14]. They believe that a student will tend to have a high resistance when the condition of the student matches the academic and environmental conditions. In the ODL system, nonacademic conditions also contribute a very dominant than the face-to-face system. A Kember model [14] has adopted a Tinto model describe the phenomenon of persistence in learning the ODL system in Figure 1.

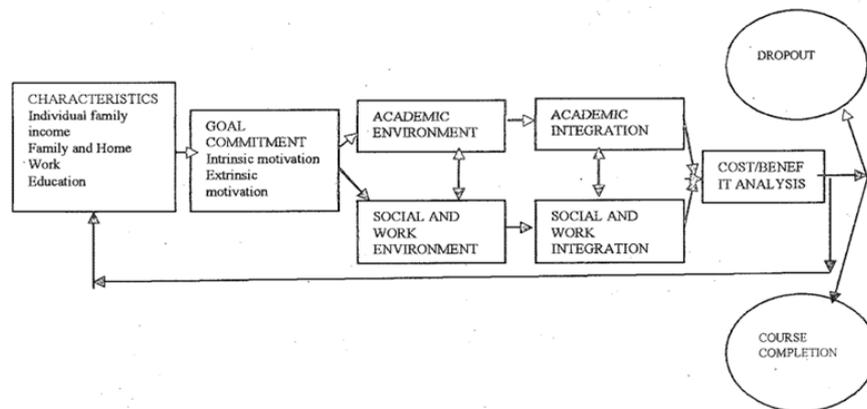


Figure 1: Kember Model about Student Persistence of ODL System

From the Kember models, in determining the persistence of learning contains dimensions: (1) commitment to the goal (include intrinsic motivation and extrinsic motivation), (2) academic integration, and (3) social integration. The process of integration between the individual, academic, and non-academic environment (social) had started when students enter a program ODL. If the condition of the environmental commitment and the commitment of academic institutions match, the students will feel safe to learn, which means that its persistence is quite high [6, 14, 18].

From the study of literature and explanations above we can conclude that the persistence of learning can be viewed as a continuum psychological aspects, from pole to pole, persistent until not persistent. Thus persistence of student learning is better seen as something that is dynamic rather than static. The model describes the relationship of the three dimensions of the UT student learning persistence construct presented in Figure 2.

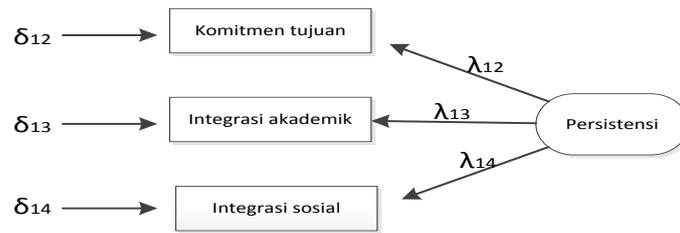


Figure 2: Measurement Model Construct Persistence of Student Learning

### III. METHODS

#### A. Participants.

The data collection was conducted from January 2015 until October 2015 and collected as many as 1876 UT student respondents spread across 14 UT Regional Centers (UPBJJ UT). Characteristics of the students in this study are presented in Table 1.

Table 1. Participants Characteristics

Variable	Category	Frequency	Percent
Group	1. Regular students	618	32.9
	2. Basic education students	1258	67.1
Faculty	1. FEKON	278	14.8
	2. FMIPA	184	8.8
	3. FISIP	156	8.3
	4. FKIP	1258	67.1
Gender	1. Male	430	22.9
	2. Female	1446	77.1
Marital status	1. Married	1054	56.2
	2. Not married	822	43.8
Job status	1. Not yet working	336	17.9
	2. Already working	1540	82.1
Highest Diploma	1. SMTA	1131	60.3
	2. D1-D2	216	11.5
	3. D3-Sarmud	66	3.5
	4. S1-S2-S3	463	24.7

#### B. Instrument.

Instruments to measure the construct of the persistence of student learning in this paper is one of the five constructs developed for dissertation research. There are five constructs developed by researcher: the construct of the internal environment of the student, the constructs of the external environment of the student, the construct of academic services, the construct of administrative services, and the constructs of the persistence of student learning.

UT student learning persistence is measured by three dimensions: the commitment to goals, the integration of academic and social integration. Dimensions commitment to goals is a commitment to the objectives of students attending UT. Dimensions academic integration of students is an attempt to integrate itself with the environmental conditions of academic institutions in order to remain in the process of completion of the program. Dimension of social integration is an effort student to integrate himself with the social environment around him to keep trying to complete the program.

To achieve the level of content validity and construct validity was good, the relationship model between constructs, dimensions, and items of instrument of measuring persistence construct is studied through focus group discussion (FGD) involving 9 raters (6 ODL experts and practitioners, 2 experts measurement, and 1 linguists). The resulting is an instrument contains items using a Likert format with 4 scale with a positive direction. Before it is used to collect data in the field, the instrument that results of the rater validation is tested to some UT students. The final result of the instrument measuring UT student learning persistence constructs are presented in the Appendix. The results of the validation and testing instruments to student persistence constructs are summarized in Table 2.

Table 2. Validation and Tryout Results of Student Persistence Construct

Dimention	Validation		Tryout		Final	
	Items	Total	Items	Total	Items	Total
Goal Commitment	B1-B9	9	B1-B6	6	B1-B6	6
Academic Integration	B10-B18	9	B7-B12	6	B7-B12	6
Social Integration	B19-B24	6	B13-B17	5	B13-B16	4
<i>Total</i>		24		17		16
<i>Cronbach Alpha</i>		0.896		0.756		0.702
<i>Content validity (V Aiken) min</i>		0.593				
<i>Validitas validity (V Aiken) max</i>		0.852				
<i>KMO</i>				0.687		0.788
<i>Participants</i>		9		96		1876
		raters		Students		students

### C. Analysis.

Data were analyzed by using a second order confirmatory factor analysis (CFA). Software IBM SPSS AMOS version 23 is used to assist the processing of this data. Because the data collected an ordinal scale data and shows no multivariate normal distribution, then the parameter estimation method used is asymptotically distribution free (ADF). The ADF estimation methods have properties that are more flexible compared to other methods that generally require multivariate normal distribution of data [19, 20, 21]. Testing suitability of measurement models used to test the goodness of fit to see the value of chi-square statistic, probability, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). Up to now there is no single statistic that can describe exactly match the measurement model, therefore it is necessary to use some of the above statistics [19, 21]. Small statistical value for chi-square and RMSEA showed that the model fit. Meanwhile for GFI statistics, AGFI, and TLI is expected to be large, indicating a more suitable models. Rule of the thumb for RMSEA is worth under 0:08, while for GFI, AGFI, and TLI is valued at over 0.9 [21, 22, 23].

## IV. RESULTS AND DISCUSSION

In general, the development of persistence constructs measurement model of learning is determined by the value of the test statistic goodness of fit and value of standardized regression weights. Statistical existing empirical data. The value of standardized regression weights greater indicates that the items relationship to dimension, or dimensions to construct the relationship is getting stronger. Recapitulation of the value of standardized regression weights model development is presented in Table 3.

An early model (Model A) on the development of persistence constructs measurement model study showed results that do not fit. This is shown by the statistic  $\chi^2 = 752.748$  and  $p = 0.000$  that is still great value and statistical value TLI=0.589 which is still very small compared with the rule of the thumb. Statistic who already meet the rule of the thumb is GFI, AGFI, and RMSEA. To decrease the value of statistical  $\chi^2$  and raise the value of TLI should be done by modifying the model. There are three strategies that can be chosen to modify this model, which is confirmatory modeling strategy, competing modeling strategy, and development model strategy [21]. In order for this construct measurement models to be better able to use the results of the output modification indices. Nevertheless, consideration in terms of the theory remains the most important thing rather than just a statistical considerations [19, 21, 24].

Tabel 3. Standardized Regression Weights and Goodness of Fit

<b>Construct/ Dimentions</b>	<b>Dimentions /Items</b>	<b>Model A</b>	<b>Model B</b>	<b>Model C</b>
Persistence	→ GC	0.756	0.824	0.810
Persistence	→ SI	-0.398	0.784	0.695
Persistence	→ AI	0.905	0.919	0.937
GC	→ B01	0.633	0.609	0.612
GC	→ B02	0.615	0.598	0.604
GC	→ B03	0.540	0.624	0.631
GC	→ B04	0.557	0.627	0.628
GC	→ B05	0.411	0.405	0.393
GC	→ B06	0.552	0.603	0.609
AI	→ B07	-0.146	0.617	0.651
AI	→ B08	-0.119	0.554	0.560
AI	→ B09	-0.101	0.160	0.256
AI	→ B10	0.885	Remove	Remove
AI	→ B11	-0.011	0,061	Remove
AI	→ B12	0.930	Remove	Remove
SI	→ B13	0.601	0.674	0.672
SI	→ B14	0.478	0.613	0.596
SI	→ B15	0.402	0.494	0.498
SI	→ B16	0.038	0.280	0.158
<b>Goodness of Fit</b>				
Chi-square		752.748	195.453	83.803
p		0.000	0.000	0.001
df		101	64	47
GFI		0.932	0.979	0.991
AGFI		0.909	0.966	0.982
TLI		0.589	0.818	0.939
RMSEA		0.059	0.033	0.020

The next model (Model B) on the development of persistence constructs measurement model is to modify the initial model by removing the items and connect between error items (covariance). First, item number 10 (participation activities online tutorials or B10) and the item number 12 (the assignment online tutorial or B12) are excluded from the measurement model. The reason is the online tutorial activity is only given to UT regular students (nonpendas), while the UT basic education student (pendas) until 2015 (when the data collection) has not received an online tutorial services. While the participants involved in this study the majority (67.1%) are UT pendas students. Item B10 and B12 is only relevant for UT nonpendas students. So the academic dimension of integration (AI) was measured with four items.

The second modification is to connect between error items that are still in one dimension. Considerations that are used to connect between error items is modification indices, and considered as the linkages aspects of the content of the items. For the dimension of goal commitment (GC), error items that are linked is erB01-erB02, erB03-erB04, erB03-erB06, erB04-erB05, and erB05-erB06. For the dimension of academic integration (AI), error items that are linked is erB07-erB09 and erB08-erB09. For the dimension of social integration (SI), error items are linked is erB13-erB16, erB14-erB16, dan erB15-erB16.

Development of persistence constructs measurement model of learning (Model B) shows the results are quite fit. This is shown by the statistic value  $\chi^2 = 195.453$  and  $p = 0.000$  are getting smaller and statistical value TLI=0.818 which greatly improved although not yet reached the value that has been set. Statistics who already meet the rule of the thumb are GFI, AGFI, and RMSEA.

To get a measurement model that is more suitable constructs persistence again, built a model other alternative measures (Model C). Modify the model by removing items and linking error items from a dimension with error items other dimensions (Fig 3). In this model, the item excluded is item B11 (face to face tutorial tasks) for the value of the coefficient lambda is too small and no significant. Output modification indices and the content of any items taken into consideration for connecting between the

error items. In the measurement model constructs persistence of this study, errorr items correlated are erB07-erB16, erB08-erB16, erB09-erB14, and erB09-erB15. Parameter estimation results in the form unstandardized regression weights for Model C are presented in Table 4.

Table 4. Unstandardized Regression Weights

	Estimate	S.E.	C.R.	P	Label
GC <--- Persistence	1,000				
SI <--- Persistence	1,673	,127	13,138	***	par_10
AI <--- Persistence	1,327	,103	12,855	***	par_11
B06 <--- GC	1,082	,058	18,723	***	par_1
B05 <--- GC	,748	,062	12,012	***	par_2
B04 <--- GC	1,129	,062	18,271	***	par_3
B03 <--- GC	1,367	,078	17,634	***	par_4
B02 <--- GC	1,065	,045	23,717	***	par_5
B01 <--- GC	1,000				
B08 <--- AI	,871	,064	13,545	***	par_6
B07 <--- AI	1,000				
B16 <--- SI	,294	,065	4,520	***	par_7
B15 <--- SI	,721	,041	17,536	***	par_8
B14 <--- SI	,859	,048	17,948	***	par_9
B13 <--- SI	1,000				
B09 <--- AI	,255	,046	5,602	***	par_14

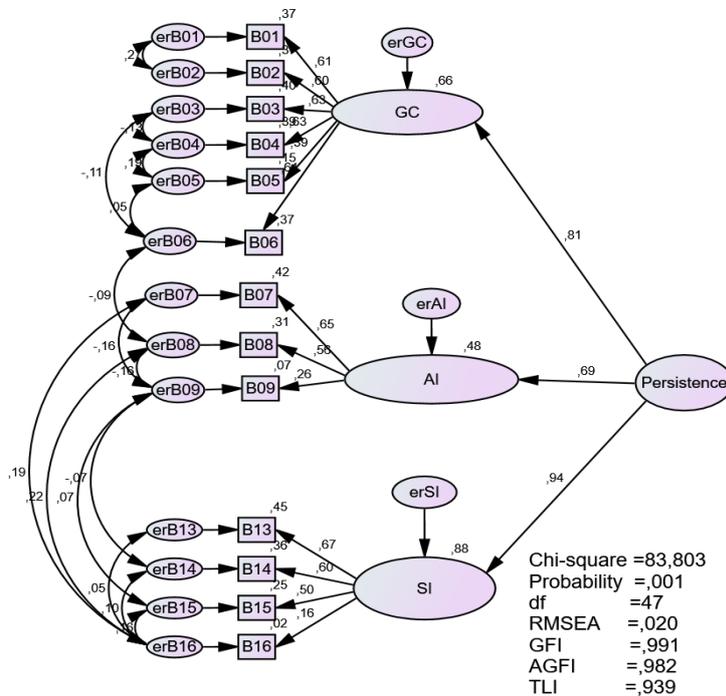


Figure 3: Measurement Model of Student Persistence Construct (Model C)

Development of persistence constructs measurement model of learning (Model C) shows the results already fit. It can be seen from across the statistical value of GFI, AGFI, TLI and RMSEA has reached the rule of the thumb that have been defined. The only statistical value still does not meet the cut off value is the chi-square  $\chi^2 = 83.803$  and  $p = 0.001$ . The ideal value of chi-square statistic which ideally is the value of probability  $p > 0.05$ . The value of chi-square statistic was likely to be significant if the sample size is quite high. There are three weaknesses that must be noted about the statistical chi-square when it is used to test the hypothesis of goodness of fit of a model, namely: (1) The chi-square test is highly dependent on the fulfillment of some prerequisites (validity of the hypothesis, normal multivariate distribution, and sample size, which very hard to meet on empirical data), (2) to get the goodness of fit are both needed a model that was more complex model, and (3) if the sample size enlarges, chi-square value is expected to increase leading to the rejection of the model even though the value of the difference between S and  $\Sigma$  has a minimum [21, 25, 26, 27, 28].

After deciding to accept a measurement model construct by testing goodness of fit, then the next step is to look at the estimated value of the parameter lambda (standardized regression weights). From Table 3 and Table 4 seems that Model C generates the estimated value of the entire parameter lambda is already quite large and significant at the 1% level. Lambda coefficient value at a significant level of first order shows that these items reflect dimensions. Lambda coefficient values on items which reflect the dimensions of goal commitment (GC) and the dimension of social integration (SI) is relatively higher than the value of the coefficient lambda on items that reflect the dimension of academic integration (AI). This result meant that items that reflect the dimensions of goal commitment (GC) and the dimension of social integration (SI) are relatively stronger than the items that reflect the dimension of academic integration (AI).

Consistent with the results of the first-order level, at the level of second order analysis results estimated value of lambda parameters were large and significant at the 1% level. This indicates that the three dimensions: the dimension of goal commitment, dimension of academic integration and dimension of social integration reflect the construct of student learning persistence. Social integration is a significant dimension of the first and most powerful ( $\lambda = 0.937$ ) in the reflect construct of student persistence. Goal commitment is the second strongest dimensional ( $\lambda = 0.810$ ) in reflecting on student persistence construct, while academic integration is the strongest third dimension ( $\lambda = 0.695$ ) in reflecting on student persistence construct.

## V. CONCLUSION

Construct of UT student persistence is reflected in three dimensions, namely social integration, goal commitment, and academic integration. Goal commitment dimension is reflected by the 6 items, dimension of academic integration is reflected by three items, and dimension of the social integration is reflected by the 4 items. The estimation results of the entire coefficient lambda test results are significant at the 1% level, both for the coefficient lambda in the first-order analysis and the second order analysis. The measurement model of UT student persistence construct has a value of goodness of fit statistics  $\chi^2=83.803$ ;  $p=0.001$ ;  $GFI=0.991$ ;  $AGFI=0.982$ ;  $TLI=0.939$ ; and  $RMSEA=0.020$ .

## REFERENCES

- [1] UT, *Katalog Universitas Terbuka 2012*. Jakarta: Penerbit Karunika UT, 2012.
- [2] A. Djali, Subandijo & Isfarudi. "Research on tutorial system of the Open University of Indonesia: Factors affecting student learning outcomes". Vol. II, Jakarta: International Development Research Center (IDRC) - Universitas Terbuka (UT), 1987.
- [3] Isfarudi. "Faktor-faktor penentu resistensi belajar mahasiswa FMIPA UT". Thesis, IKIP Jakarta, unpublished, Jakarta, 1994.
- [4] E. Mahdiarti, M. Syaeful & Isfarudi. "Studi pembiayaan, manfaat dan keputusan enrolmen mahasiswa program S1 UT dan universitas biasa: Tinjauan tentang pembiayaan". Jakarta: PAU-PPAI Universitas Terbuka, 1990.
- [5] UT, *Katalog Universitas Terbuka 1990*. Jakarta: Penerbit Karunika UT, 1990.
- [6] T. Belawati. "Increasing student persistence in Indonesian post-secondary distance education". Dissertation, Unpublished, The Faculty of Graduate Studies, the University of British Columbia, 1995.
- [7] T. Belawati. "Increasing student persistence in Indonesian post-secondary distance education". *Distance Education*, vol. 19, no. 1, pp. 18-108, 1998.
- [8] J.P. Bean. "Dropout and turnover: The synthesis and test of a causal model of student attrition". *Research in Higher Education*, vol. 12, no. 2, pp. 155-187, 1980.
- [9] J.P. Bean. "Student attrition, intentions, and confidence: Interaction effects in the a path model". *Research in Higher Education*, vol. 17, no. 4, pp. 291-320, 1982.
- [10] W. Kemp. "Persistence of adult learner in distance education". Thesis, Athabasca University, Unpublished, 2001. Available: <http://auspace.athabasca.ca/bitstream/2149/541/1/kemp.pdf>.

- [11] H. Street. "Factors influencing a learner's decision to drop-out or persist in higher education distance learning". *Online Journal of Distance Learning Administration*, vol. 13, no. 4, 2010. Available: <http://www.westga.edu/~distance/ojdla/winter134/street134.html>
- [12] R. Sweet. "Student dropout in distance education: An application of Tinto's model". *An International Journal Distance Education*, vol. 7, no. 2, pp. 201-213, 1986.
- [13] P.T. Terenzini & E.T. Pascarella. "Toward the validation of Tinto's model of college student attrition: A review of recent studies". *Research in Higher Education*, vol. 12, no. 3, pp. 271-282, 1980.
- [14] D. Kember. "A longitudinal process model of drop-out from distance education". *Journal of Higher Education*, vol. 60, no. 3, pp. 278-310, 1989.
- [15] V. Tinto. "Dropout from higher education: A theoretical synthesis of recent research". *Review of Educational Research*, vol. 45, no. 1, pp. 89-125, 1975.
- [16] W.G. Spady. "Dropout from higher education: An interdisciplinary review and synthesis". *Interchange*, vol. 1, pp. 64-85, 1970.
- [17] D.J. Ratnaningsih, A. Saefuddin, & H. Wijayanto. "Analisis daya tahan mahasiswa putus kuliah pada pendidikan tinggi jarak jauh (Studi kasus: Mahasiswa jurusan Manajemen Fakultas Ekonomi Universitas Terbuka)". *Jurnal Pendidikan Terbuka dan Jarak Jauh*, vol. 9, no. 2, hal. 101-110, 2008.
- [18] D. Kennedy and R. Powell. "Student progress and withdrawal in the Open University". *Teaching at a Distance*, vol. 7, Nov, pp. 61-75, 1976.
- [19] J.L. Arbuckle. *IBM SPSS AMOS 23.0 User's Guide*. AMOS Development Corporation, 2014.
- [20] G.D. Garson. *Structural equation modeling*. Blue Book, Statistica Associates Publishing, 2012.
- [21] J.F. Hair, W.C. Black, B.J. Babin & R.E. Anderson. *Multivariate data analysis: Global edition*. 7<sup>th</sup> Edition. New York: Pearson Education, 2010.
- [22] K.A. Bollen. "A new incremental fit index for general structural equation models". *Sociological Methods and Research*, vol. 17, no. 3, pp.303-316, 1989.
- [23] R.E. Schumacker and R.G. Lomax. *A beginner's guide to structural equation modeling*. Third Edition. New Jersey: Lawrence Erlbaum Associates, 2010.
- [24] H. Latan. *Model persamaan struktural: Teori dan implementasi AMOS 21.0*. Bandung: Penerbit Alfabeta, 2013.
- [25] R.O. Mueller. *Basic principle of structural equation modeling: An introduction to LISREL and EQS*. Springer-Verlag, 1996.
- [26] L.R. Tucker and C. Lewis. "A reliability coefficient for maximum likelihood factor analysis". *Psychometrika*, vol. 38, no. 1, pp. 1-10, 1973.
- [27] S.H. Wijanto. *Structural equation modeling dengan Lisrel 8.8: Konsep dan tutorial*. Jakarta: Penerbit Graha Ilmu, 2008.
- [28] S.H. Wijanto. *Metode penelitian menggunakan structural equation modeling dengan Lisrel 9*. Jakarta: Lembaga Penerbitan FE UI, 2015.

## APPENDIX

### INSTRUMEN KONSTRUK PERSISTENSI BELAJAR MAHASISWA

NO	PERNYATAAN	JAWABAN			
		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	Belajar di UT dapat memenuhi harapan saya dalam menempuh pendidikan tinggi.	<input type="radio"/> Tidak Yakin	<input type="radio"/> Kurang yakin	<input type="radio"/> Yakin	<input type="radio"/> Sangat Yakin
2	Belajar di UT dapat meningkatkan pengetahuan saya.	<input type="radio"/> Tidak yakin	<input type="radio"/> Kurang yakin	<input type="radio"/> Yakin	<input type="radio"/> Sangat yakin
3	Saya tetap memilih UT, meskipun ada kesempatan untuk pindah belajar ke lembaga lain.	<input type="radio"/> Tidak yakin	<input type="radio"/> Kurang yakin	<input type="radio"/> Yakin	<input type="radio"/> Sangat yakin
4	Saya telah mengalokasikan waktu secara maksimal untuk kegiatan belajar di UT.	<input type="radio"/> Tidak setuju	<input type="radio"/> Kurang setuju	<input type="radio"/> Setuju	<input type="radio"/> Sangat setuju
5	Saya telah mengalokasikan dana yang cukup untuk kegiatan belajar di UT.	<input type="radio"/> Tidak setuju	<input type="radio"/> Kurang setuju	<input type="radio"/> Setuju	<input type="radio"/> Sangat setuju
6	Menyelesaikan pendidikan di UT merupakan hal yang penting bagi saya.	<input type="radio"/> Tidak penting	<input type="radio"/> Kurang penting	<input type="radio"/> Penting	<input type="radio"/> Sangat penting
7	Apabila dalam modul ada yang tidak jelas, saya berusaha bertanya kepada siapa saja yang saya anggap tahu.	<input type="radio"/> Tidak pernah	<input type="radio"/> Jarang	<input type="radio"/> Sering	<input type="radio"/> Selalu

NO	PERNYATAAN	JAWABAN			
8	Untuk memahami materi modul dengan baik, saya mencari sumber literatur lainnya.	<input type="radio"/> Tidak pernah	<input type="radio"/> Jarang	<input type="radio"/> Sering	<input type="radio"/> Selalu
9	Saya mengikuti kegiatan tutorial tatap muka yang diselenggarakan oleh UT (rata-rata tiap mata kuliah) sebanyak:	<input type="radio"/> tidak pernah	<input type="radio"/> 1-3 pertemuan	<input type="radio"/> 4-6 Pertemuan	<input type="radio"/> 7-8 pertemuan
10	Saya mengikuti kegiatan tutorial <i>online</i> yang diselenggarakan oleh UT (rata-rata tiap mata kuliah) sebanyak:	<input type="radio"/> tidak pernah	<input type="radio"/> 1-3 inisiasi	<input type="radio"/> 4-6 inisiasi	<input type="radio"/> 7-8 inisiasi
11	Tugas tutorial tatap muka yang saya kerjakan dengan baik (rata-rata tiap mata kuliah) adalah:	<input type="radio"/> Tidak pernah	<input type="radio"/> 1 tugas	<input type="radio"/> 2 tugas	<input type="radio"/> 3 tugas
12	Tugas tutorial <i>online</i> yang saya kerjakan dengan baik (rata-rata tiap mata kuliah) adalah:	<input type="radio"/> Tidak pernah	<input type="radio"/> 1 tugas	<input type="radio"/> 2 tugas	<input type="radio"/> 3 tugas
13	Meskipun di UT dengan sistem belajar mandiri, saya tidak merasa 'kesendirian' atau 'kesepian'.	<input type="radio"/> Tidak Setuju	<input type="radio"/> Kurang setuju	<input type="radio"/> Setuju	<input type="radio"/> Sangat setuju
14	Saya merasa kuliah di UT dapat meningkatkan status sosial di masyarakat.	<input type="radio"/> Tidak setuju	<input type="radio"/> Kurang setuju	<input type="radio"/> Setuju	<input type="radio"/> Sangat setuju
15	Saya berinteraksi dengan sesama mahasiswa UT.	<input type="radio"/> Tidak pernah	<input type="radio"/> Jarang	<input type="radio"/> Sering	<input type="radio"/> Selalu
16	Saya berinteraksi dengan mahasiswa perguruan tinggi lain (selain mahasiswa UT).	<input type="radio"/> Tidak pernah	<input type="radio"/> Jarang	<input type="radio"/> Sering	<input type="radio"/> Selalu