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Application of Confirmatory Factor Analysis and Latent Growth Model to Examines the Goal-Setting Behavior of Students

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Abstract: Student's goal-setting is the process of identifying specific academic, personal, and professional objectives and then planning concrete steps to achieve them during time in university. The purpose of this research is identifying and confirming the factor structure of the goal-setting construct using the Confirmatory Factor Analysis (CFA) and Latent Growth Modelling (LGM) approaches to analyse the growth model of goal-setting over time. The population in this study consists of active third-semester students of Muhammadiyah Universities in Lampung Province Indonesia. The research was conducted using a longitudinal design by observing changes in students' views or thoughts in setting goals over three different time periods. The resulting factor scores were analysed descriptively and comparatively to observe changes in goal-setting scores. The research results show that the factor loading values for each item indicate the strength of the relationship between the indicators and the latent goal-setting, also the consistent increase in goal-setting scores during each measurement period. However, the variation among individuals goal-setting in the third period was statistically insignificant, meaning the differences among individuals were narrowing. This indicates that most individuals have aligned their goals with real situations through the fulfilment of aspects such as choice selection, loss-based selection, goal relevance, and methods/resources. This research provides an overview of the importance of reinforcing the four aspects of goal-setting in supporting the development of students' goal-setting in the university environment, as well as the interventions that need to be carried out to support this reinforcement.

Keywords: Confirmatory Factor Analysis, Latent Growth Modelling, Goal-Setting, Choice Selection, Loss-Based Selection, Goal Relevance, Methods/Resources

1. Introduction

Setting objectives is a critical component of human growth, particularly in the context of higher education (Schippers *et al.,* 2020; Kong, 2021). Students who have good goal-setting abilities tend to be more focused (Grajcevci & Shala, 2021; Martins van Jaarsveld et al., 2024), motivated (Grajcevci & Shala, 2021; de Vreugd *et al.,* 2025), and has effective strategies for achieving academic success (Sides & Cuevas, 2020; Blegur *et al.,* 2021; Cheng, 2023). Goal-setting among students plays a fundamental role in efforts to achieve not only academic success but also personal development (Schippers *et al.,* 2020; Martins van Jaarsveld *et al.,* 2024, Dekker *et al.,* 2024).

In previous studies, the identification of aspects forming goal-setting was often conducted exploratively (Urdan & Kaplan, 2020; Eckhoff & Weiss, 2020) and has not yet provided certainty regarding the factor structure underlying the goal-setting construct. Additionally, most studies are only conducted cross-sectionally, so they have not yet been able to explain the dynamics of goal-setting ability changes over time. Therefore, research is needed not only to confirm the dimensions that make up the goal-setting construct through Confirmatory Factor Analysis

(CFA), but also to observe the development and changes in these abilities within a longitudinal framework using Latent Growth Modeling (LGM).

Muhammadiyah is one of the largest and most influential organizations in Indonesia. In order to modernize and empower Indonesian society through easily available, high-quality education, it operates a vast educational network that spans from kindergarten through higher education (Harimurti, 2022; Kurniawati & Junaidi, 2024). In province of Lampung there are Muhammadiyah Universities (MU), including Universitas Muhammadiyah Lampung (UML), Universitas Muhammadiyah Metro (UMM), Universitas Muhammadiyah Kotabumi (UMKO), and Universitas Muhammadiyah Pringsewu (UMPRI). A significant issue which has been encountered by these four universities is the ongoing discovery of students who wish to change their study plans or transfer to another university after classes have started. This problem demonstrates that there is still no clear goal directing students' efforts to complete their education.

This study aims to investigate the dimensions that can help clarify the goal-setting of students at MU in Lampung through CFA and understand their psychological dynamics in setting their goals over time through LGM. Specifically, the objectives of this study are (1) to identify and confirm the psychological structure underlying MU students' goal-setting behaviour using the CFA approach; (2) to build a longitudinal model of MU students' goal-setting development (over different time periods), utilizing factor score results as representative indicators of the development of each aspect of goal-setting; (3) to analyse the dynamics of factor score changes over time using LGM. The study results then can be used as a basis for developing intervention programs that support improving students' goal-setting abilities.

2. Methods

2.1. Sample and Procedure

This study uses a longitudinal design aimed at observing changes and developments in students' goal-setting abilities over a specific period. This study was conducted on active third-semester students within the MU in Lampung Province, Indonesia. The research focused on the third-semester students was based on psychological considerations and its relevance to the goal-setting framework, having passed the initial adaptation period (first and second semesters) to academic life in higher education, making them relatively more stable in their learning behaviour, social interaction patterns, and motivation (Çebi & Güyer, 2020; Wong & Hughes, 2023).

One type of questionnaire used in this study is a Likert scale questionnaire with responses listed on 5 points, ranging from 1 ('strongly disagree') to 5 ('strongly agree'). This questionnaire mostly uses items that are submitted in a positive manner, which is frequently done to improve interpretation and decrease respondent hesitancy because positive responses are typically easier to understand and have a lower chance of being rejected (Salazar, 2015; Camelia & Ferris, 2018). Additionally, the goal-setting construct is more appropriate for using positively worded questions (Abdulla & Woods, 2021). A closed questionnaire was distributed to 272 students, who were selected using cluster sampling. The sample size was determined based on the recommendation of a minimum sample size of 200, which is suggested for use in CFA models (Tinsley & Brown, 2000; Ondé & Alvarado, 2018).

2.2. Instruments and Measures

The instrument trial for goal-setting consisted of 50 student respondents outside the sample. Experts, Aiken's validation, item validation, and reliability (Fernández-Gómez *et al.*, 2020; Maulana, 2023) tested the questionnaire instrument thru four stages: content validation. Expert validity involves two experts with different abilities, with the hope that this will result in two different approaches, leading to different values and conclusions drawn from the assessment (Davis, 1992; Polit & Beck, 2006; Yusoff, 2019). Based on the expert assessment results, Aiken's validity was then calculated, yielding an Aiken value of 1, which means the instrument is perfectly valid. Next, the item validity with Pearson product-moment correlation (Park *et al.*, 2020) results showed that 35 items were declared valid and 15 items were declared invalid. The items declared invalid were due to their correlation values not reaching more than 0.3 (Anggraini *et al.*, 2020). The 35 valid items were then used to calculate their reliability using Cronbach's alpha coefficient (Gong *et al.*, 2021), resulting in a value of 0.922, which means the instrument is reliable.

The following is Table 1 which shows the valid and reliable questionnaire instrument goal-setting, with the following aspects and item indicators:

The survey is conducted following the completion of the instrument's testing. This survey was conducted three times during the middle and end of the odd semester and the middle of the even semester of the 2024–2025 academic year. The choice of research subjects is based on consideration that the third semester students are currently undergoing a period of adaptation and adjustment to academic and organizational activities, including dealing with academic evaluations and organizational activities, this time frame was selected.

Table 1. Identification of Valid and Reliable Goal-setting Indicators and Aspects

Variable	Aspect	Indicator	Item
Laten	Choice selection	Specification of objectives	Y_1
		Target system	Y_2
		Contextualization of goals	Y_3-Y_5
		Commitment target	Y_6-Y_7
	Loss-based selection	Focusing on the most important goals	Y_8-Y_9
		Reconstruction of the target hierarchy	Y_{10}-Y_{11}
		Standard adaptation	Y_{12}-Y_{13}
	Relevance of the goal	Searching for new goals	Y_{14}-Y_{16}
		Focus of attention	Y_{17}-Y_{19}
		Making the most of the right moment	Y_{20}
		Perseverance	Y_{21}-Y_{22}
		New skills/resources	Y_{23}
		Skill training	Y_{24}-Y_{25}
		Time allocation	Y_{26}-Y_{29}
	Methods/resources to address the decline relevant to the goals	The use of interventions to acquire new skills/resources	Y_{30}
		Activation of unused skills/resources	Y_{31}
		Increase in effort/energy	Y_{32}
		Increase in time allocation	Y_{33}-Y_{34}
		Balancing optimization negligence in another way	Y_{35}

2.3. Data Analysis Technique

The CFA and LGM analysis was carried out over the questionnaire result data using RStudio 2025.09.0+387 software. CFA was used to test whether empirical data supports the specified model, including (1) the relationship between items and a certain factor (Gamst-Klaussen *et al.,* 2018; Goretzko *et al.,* 2024); (2) the number of factors underlying the goal-setting construct (Oyeniran *et al.,* 2025); and (3) the level of contribution of each item to the hypothesized factor (Alavi *et al.*, 2020; S & Mohanasundaram, 2024). CFA can produce factor scores that represent the latent values of each dimension of goal-setting for each individual (Kim *et al.*, 2021; Kiendl & Hennecke, 2022). The factor scores of goal-setting then was analysed using LGM to understand its growth or changes that occur over time (Clark, 2021; Rioux *et al.,* 2021, Smid *et al.,* 2020).

3. Result and Discussion

3.1 Psychological structure underlying students' goal-setting behaviour using CFA

The CFA result is presented in Table 2 and Table 3. The loading factor values shows the strength of the relationship between an indicator (question item) and the latent factor (goal-setting). Goal-setting is constructed based on four aspects: choice selection, loss-based selection, goal relevance, and means/resources to achieve the goal. The results shown in Table 2 explaining that (1) in periods I, II, and III, most of the loading value gains reached ≥0.7 so that it can be stated that the contribution or relationship between each item and goal-setting is classified as

very strong and ideal; (2) there is one item Y19 the acquisition of its loading value 0.667 including quite strong and still within acceptable limits; and (3) all factor loadings are significant p<0.001, meaning all indicators can significantly measure the construct.

Table 2. The result of loading values of Goal-setting in periods I, II, and III (the " **" symbol indicates a high significancy of the item, i.e. p-value < 0.01)

Goal-setting				
Factor	**Item**	**Period I**	**Period II**	**Period III**
		Loading	**Loading**	**Loading**
1	Y_1	1**	1**	1**
	Y_2	1.013**	1.041**	0.872**
	Y_3	1.347**	1.345**	1.081**
	Y_4	1.284**	1.446**	1.078**
	Y_5	1.494**	1.471**	1.087**
	Y_6	1.409**	1.320**	1.043**
	Y_7	1.301**	1.316**	1.041**
2	Y_8	1**	1**	1**
	Y_9	1.073**	0.974**	0.932**
	Y_{10}	1.031**	0.898**	0.921**
	Y_{11}	0.869**	0.964**	0.948**
	Y_{12}	0.926**	0.893**	0.974**
	Y_{13}	0.866**	0.952**	0.971**
3	Y_{14}	1**	1**	1**
	Y_{15}	0.779**	0.982**	1.164**
	Y_{16}	0.892**	1.069**	1.201**
	Y_{17}	1.047**	1.025**	1.130**
	Y_{18}	0.881**	1.084**	1.084**
	Y_{19}	0.667**	0.626**	0.748**
	Y_{20}	0.827**	0.941**	0.901**
	Y_{21}	0.988**	1.080**	1.199**
	Y_{22}	1.073**	1.067**	1.228**
	Y_{23}	1.147**	1.115**	1.274**
	Y_{24}	1.109**	1.036**	1.184**
	Y_{25}	1.058**	1.105**	1.110**
	Y_{26}	1.078**	1.024**	1.167**
	Y_{27}	1.105**	1.056**	1.121**
	Y_{28}	0.944**	1.116**	1.241**
4	Y_{30}	1**	1**	1**
	Y_{31}	0.752**	0.971**	0.849**
	Y_{32}	0.947**	0.994**	0.929**
	Y_{33}	0.941**	0.907**	1.054**
	Y_{34}	1.012**	0.902**	0.999**
	Y_{35}	0.793**	0.914**	0.951**

The first aspect "choice selection" related to the selection of goals that align with the values, abilities, and opportunities possessed by students. This is in line with the theory of Selection, Optimization, and Compensation (SOC) from Baltes & Baltes (1993) which explains that proactive selection of goals allows individuals to allocate resources towards the most valuable direction Hartono and Murniati (2020) & Zhang *et al* (2024) which states that the highest performance achievement by someone is based on that person having specific and challenging goals, thereby forming individual motivation to achieve the goals and more challenging goals lead people to work harder but to also experience greater stress doing so. The second aspect "loss-based selection" measuring how students

respond to challenging conditions or losing their sense of direction. Someone who is able to restructure their goals when facing obstacles demonstrates high resilience, as they do not dwell on failure but are able to rise and adjust the direction of their life (Freund & Baltes, 2002; D. A. P. Grimm *et al.,* 2023). The next aspect "goal relevance", the result indicates that students not only have goals but are also able to maintain the connection between goals and daily actions such as time allocation, attention focus, seizing moments, perseverance, and skilfulness. This supports the idea of E. A. Locke & Latham (2002) in the goal-setting theory that emphasizes the importance of challenging and relevant goals to improve performance. The fourth aspect "methods/resources to address the decline relevant to the objectives" related to the use of interventions, skill activation, increased effort/energy, increased time allocation, and compensating for optimization neglect. Furthermore, successful goal-setting does not only depend on motivation but also on execution capacity, with skill activation referring to the process of activating possessed competencies such as problem-solving ability, time management ability, or communication ability (Adlina *et al.,* 2024).

Table 3. Model fit indexes of Goal-setting in periods I, II, and III

Goal-setting						
Evaluation	**Period I**		**Period II**		**Period III**	
	Value	**Exp**	**Value**	**Exp**	**Value**	**Exp**
Degrees of freedom (df)	521	-	521	-	521	-
Ratio Chi-square (χ^2)/df	2.132	Good fit	2.475	Good fit	2.695	Good fit
Comparative Fit Index (CFI)	0.862	Quite good	0.876	Quite good	0.872	Quite good
Tucker-Lewis Index (TLI)	0.851	Quite good	0.867	Quite good	0.862	Quite good
Root Mean Square Error of Approximation (RMSEA)	0.065	Acceptable fit	0.074	Acceptable fit	0.079	Acceptable fit
RMSEA CI (90%)	0.059 – 0.07	Fair	0.069 – 0.079	Fair	0.074 – 0.084	Fair
Standardized Root Mean Residual (SRMR)	0.054	Good fit	0.059	Good fit	0.055	Good fit

The goodness of fit results in Table 3 show that the goal-setting model consistently achieved an acceptable to good fit across the three measurement periods, with the χ^2/df ratios are in the range of 2.132–2.695 (χ^2/df < 3 criteria), the CFI values ranged from 0.862 to 0.872, and the TLI values ranged from 0.851 to 0.867. Meanwhile, the RMSEA value falls within the range of 0.065–0.079, the SRMR value of 0.054–0.059 is within the good fit range (≤0.08). This means that the dimensions constructed in the model, namely choice selection, loss-based selection, goal relevance, and the methods/resources to achieve goals, adequately represent the empirical data of the students. The relatively stable model fit from period I to III suggests that the factor structure constructed is consistent in representing the dynamics of goal-setting.

Theoretically, these findings are relevant to the Goal-setting theory of Locke & Latham (2002) which emphasizes the importance of clarity, challenge, relevance, and commitment in goal formulation. Good fit results indicate that the indicators (question items) are indeed capable of capturing the key components of the theory, such as goal clarity, goal relevance, and the use of strategies and resources. Additionally, within the theoretical framework of SOC the success of this model demonstrates that students are actively implementing the processes of selection (choosing appropriate goals), optimization (allocating effort and strategies), and compensation (adjusting when facing limitations or failures). Thus, the results of this fit model not only statistically prove feasibility but also provide empirical support that the goal-setting process in students is indeed aligned with the SOC theoretical framework.

3.1 Analysis of the dynamics of goal-setting over time using LGM

The goal-setting scores obtained from CFA were then modelled using LGM and the results are presented in Table 4 and Table 5. Based on Table 4, the goal-setting growth model shows a very perfect fit to the data, as evidenced by the statistical acquisition of the chi-square value = 0.000 with p-value = 0.999, CFI = 1.000, TLI = 1.016, RMSEA =

0.000, and SRMR = 0.000. The results indicate that the model structure produced is statistically fit the data very well (perfect fit). Not only do all fit indices show optimal values, but the pattern of relationships between latent variables also provides coherent theoretical insights. Thus, this model can be relied upon to explain the longitudinal dynamics of goal-setting development.

Table 4. Model Fit Evaluation with LGM

Goal-setting			
Evaluation	**Value**	**p-value**	**Explanation**
Chi-square	0.000	0.999	The model is very good (not significantly different from the actual data)
CFI	1.000	-	CFI ≥ 0.95 very good
TLI	1.016	-	TLI ≥ 0.95 very good
RMSEA	0.000	-	Showing very small approximation error
RMSEA CI (90%)	0.000 – 0.000	-	Showing very small approximation error
SRMR	0.000	-	SRMR $\leq$ 0.05, very good

Table 5 shows the results of the achievements in GS1 (goal-setting period 1), GS2 (goal-setting period 2), and GS3 (goal-setting period 3). The standard loading results on the intercept factor indicate that the initial goal-setting scores are at a medium-high level, and the largest standard loading results on the slope factor in GS3 show that the most significant changes occur in period III. The covariance results of the intercept and slope indicate a significant negative relationship between the initial scores (intercept/i) and the rate of change (slope/s), meaning this indicates that students with high initial goal-setting scores in GS1 tend to experience slower changes in their scores in subsequent periods, while students with low initial scores experience greater improvements. This pattern is known as the compensation effect (Grimm *et al.*, 2017; Troiano *et al.*, 2021). The compensatory effect in LGM explains that initial differences between individuals do not always determine the final outcome.

Table 5. Results of latent parameters, covariance, and variance periods I, II, and III.

Parameter Latent			
Factor	**Variable**	**Loading standar**	**Explanation**
i (intercept)	GS1	0.758	Indication that the initial goal-setting score is at a medium-high level
	GS2	0.717	
	GS3	0.702	
s (slope)	GS1	0.000	Measuring score changes over time (period I, II, and III)
	GS2	0.475	
	GS3	0.930	
Covariance of intercept and slope			
Estimation	**z-value**	**p-value**	**Explanation**
-0,029	-2.161	0.031	There is a significant negative relationship between the initial score and the rate of change
Variance			
Variable	**Estimation**	**p-value**	**Explanation**
GS1	0.102	0.000	Significant
GS2	0.129	0.000	Significant
GS3	0.018	0.482	Not significant
Intercept	0.138	0.000	Significant
Slope	0.060	0.000	Significant

This certainly sends an important signal that educational interventions should not only focus on high-achieving students, but that low-achieving students also have significant growth potential if guided properly. This effect certainly explains the importance of supporting the learning process at all times, not just based on initial ability, meaning that a person's ability will always grow if managed well (Huang *et al.,* 2024; García-Machado *et al.,* 2024). Similarly, with goal-setting, students can experience a significant increase in the components of choice selection, loss-based selection, goal relevance, and methods/resources, if accompanied by a good learning process. Certainly, this compensatory effect aligns with the SOC theory, which explains that individuals can adapt thru compensatory mechanisms when facing limitations (Freund, 2008; Moksnes & Espnes, 2020).

The visualization of the presence of GS1, GS2, and GS3 can be illustrated in the LGM diagram as follows:

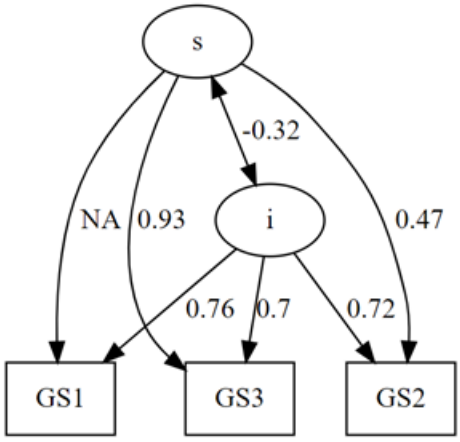

Figure 1. LGM diagram on goal-setting data

Figure 1, it can be noted that: (1) students have different initial values (intercept) in goal-setting, as seen from the loadings of 0.93 (GS1), 0.76 (GS2), and 0.7 (GS3); (2) the role of the intercept (i) is strong at the beginning and the slope (s) increases in the second and third periods, as seen from the loading slope of GS2 at 0.47, indicating that the slope contributes to the increase in goal-setting scores in the second period, reflecting the development or change in goal-setting behavior, while the relationship of the slope to GS1 is not displayed (NA), because the loading in the model is set to 0 as the reference for the initial time, the initial time set to 0 is to identify changes, as the model requires a reference point, and this reference point is the initial time that can be given a loading slope = 0; (3) there is a negative correlation between (i) and (s) of -0.31, indicating that students with high initial goal-setting tend to experience slower growth; and (4) the loading values between the intercept/slope towards GS1-GS3 show the contribution of latent factors in explaining the actual scores.

The analysis of the LGM growth model on the latent variable of goal-setting measured over three periods (period I, II, and III) shows significant developmental dynamics that are very much in line with the four-dimensional theoretical framework. In the early period, the LGM results indicate significant variance in the first period of goal-setting with a gain (p<0.001), meaning there are substantial individual differences in initial goal-setting. This is consistent with the theory that in the early stages, individuals are still free to set goals based on preferences for choice selection, loss-based selection, goal relevance, and methods/resources to repeat declines relevant to the goal (Pritchard-Wiart *et al.,* 2019; Molinaro & Collins, 2023).

In the next phase, goal-setting adapts to new conditions or obstacles, indicating the occurrence of loss-based selection in individuals who must adjust or reconsider the goals they want to achieve, "whether there is a change or not?". In this second phase, individuals experience an adjustment in their goal-setting mindset, which is also in line with the statistical results showing significant variance in goal-setting during the second period (p < 0.001), indicating individual adjustments. The fact that the goal-setting slope increased from the first to the second period suggests that some students can continue to establish goals or even improve upon them in spite of obstacles. According to research by Hartono & Murniati (2020), people who have high levels of difficulty and defined goals will be more inclined to plan, assess what is required, and come up with solutions to reach those goals. Additionally, the basic process of the planning effect is outlined with the hope of a better understanding of the type of planning that might be most effective in promoting flexible yet sustainable goal-setting (Gollwitzer & Sheeran, 2025).

Goal-setting in the third period showed better results compared to the previous period. From the results, the group of students has made efforts to better identify themselves in measuring the consistency of goal-setting from the aspects of choice selection, loss-based selection, goal relevance, and methods/resources to repeat relevant declines. In this period, the results show insignificant variation among individuals (p = 0.482), which means the differences between individuals are becoming narrower. This means that at the final stage, most individuals have aligned their goals with the actual situation by adjusting compensation strategies in goal-setting. When the primary option fails (choice selection), time is lost (loss-based selection), the objective is still relevant even when strategies change (goal relevance), or more resources are needed (methods/resources), compensation techniques are necessary (Jeong et al., 2023).

3.3 Contributions to the development of evaluation instruments and educational interventions

By enhancing the comprehension of goal-setting as a dynamic and changing process throughout time, the conceptual reinforcement of goal-setting makes a theoretical contribution. Setting short-term, fixed goals is simply one aspect of goal-setting theory; another is a long-term life strategy that adapts to society and personal circumstances. Moreover, the theoretical contribution provided, namely the results of confirmatory analysis and growth model with LGM, shows that the ability of goal-setting can be constructed from specific psychological aspects. The practical contributions that can be provided are: (1) the development of an evaluation instrument for students' goal-setting competencies based on these four aspects can further develop a factor-based measurement tool capable of comprehensively assessing how well students can choose and set goals, how adaptive students are in adjusting goals when facing obstacles, how high the attachment and personal meaning to goals are, and how effective students are in using resources to achieve goals; (2) the results of this research can serve as a basis for designing training programs or educational interventions such as goal management training, personal and academic goal-setting workshops, and programs to strengthen the meaning and commitment to life goals; and (3) the results of the growth model (LGM) on longitudinal data can produce a mapping of the development of goal-setting abilities over time, as well as adjust academic and non-academic support according to the needs at each developmental phase.

The explanation of the interconnectedness of the four aspects to goal-setting, the researcher can recommend forms of educational intervention that can be implemented by lecturers, practitioners, or universities, as shown in Figure 2 below:

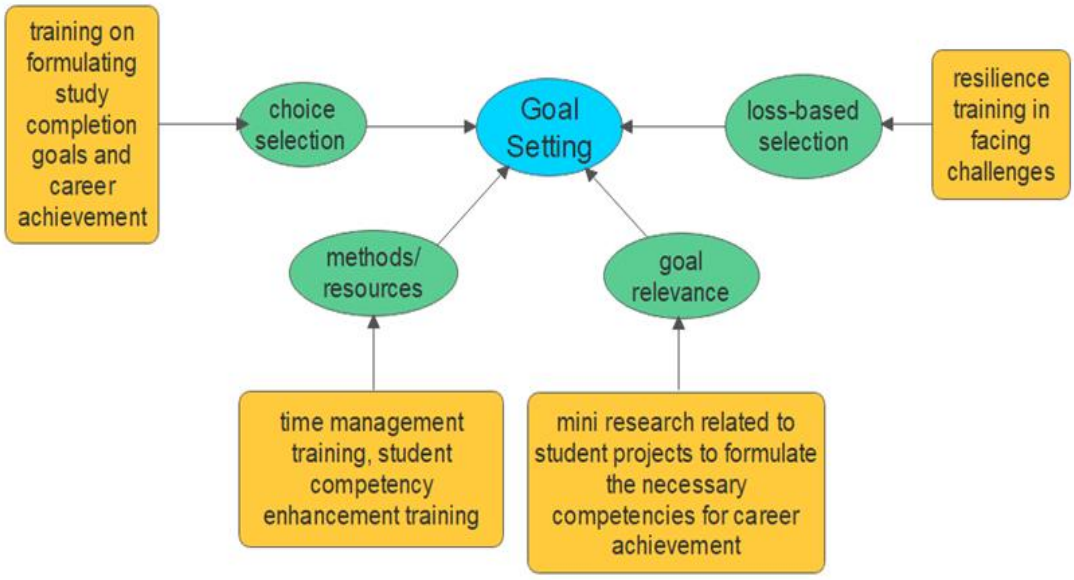

Figure 2. Recommendations for educational interventions in every aspect of goal-setting

Based on Figure 2, it is hoped that both lecturers, practitioners, and universities can provide these interventions in the form of community service, as an effort for the students to have specific goals and direct their attention to tasks relevant to those goals, rather than tasks are not relevant. This aligns with the research by Jeong

et al., (2023) which states that having clear goals, being brave enough to face challenges while maintaining those goals, and being able to prevent losses will help maintain the set goals at a higher functional level.

4. Conclusion

The goal-setting analysis of students at Muhammadiyah Universities in Lampung Province, based on the CFA scores obtained shows that the factor loading values for each item indicate the strength of the relationship between the indicators (question items) and the latent factor (goal-setting). The results of the LGM show that a perfect model fit and a negative correlation between the intercept and slope, affirm that the processes of measuring choice selection, loss-based selection, goal relevance, and methods/resources for repeating relevant declines work systematically in the development of goal-setting over time. The higher the students' involvement in fulfilling the four aspects, the higher the quality of the goals set and the higher the goals that can be achieved. This reflects the process of students' readiness to face academic challenges as well as life challenges. The theoretical and practical contributions of this research not only expand the understanding of the psychological dimensions of goal-setting but also provide a strong foundation for developing valid measurement tools and evidence-based educational interventions. This ultimately aims to help students become more reflective, adaptive, and resilient individuals in setting and achieving their life goals. Based on these results, the innovations in this research are (1) the conceptual integration of four dimensions of goal-setting based on the SOC theory; (2) the use of CFA for factor score acquisition; (3) the application of LGM to analyze the development of goal-setting over time; and (4) practical implications for the development of educational interventions.

Suggestions for future research is expanding the population to include students from diverse backgrounds, which would result in stronger external validity of the findings and provide a more comprehensive picture of goal-setting dynamics among Indonesian students. Furthermore, it can be included by supplementing self-report measurements with behavioural observation methods, faculty evaluations, or peer assessments. This can be done to obtain more objective and comprehensive triangulated data and can expand the study of goal-setting with other latent variables according to psychological theory. Then, other relevant statistical methods can be utilized, such as considering multilevel Structural Equation Modelling (SEM), Generalized Estimating Equation (GEE), or intervention studies that examine compensation mechanisms in the context of goal-setting.

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Author Contribution Statement

Rahma Faelasofi: Conceptualization, Methodology, Writing-Original Draft. Khoirin Nisa: Data Curation, Investigation, Writing-Review & Editing. Mustofa Usman: Formal analysis in education, Visualization, Supervision. Tina Yunarti: Formal analysis, Visualization. All authors have read and agreed to the published version of the manuscript.

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