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Validation of the Persian Version of the Student Individual Agency Scale

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ABSTRACT

Objective: One of the key variable in students' learning is the sense of individual agency. However, due to the lack of measurement tools in Iran's higher education, research in this area is limited. Thus, the aim of the present study was to introduce and validate a tool for measuring students' individual agency.

Method: The research was descriptive-correlational. The statistical population included 1364 student-teachers at Farhangian University, Kurdistan Province. A sample of 271 students was selected using systematic random sampling. Data were collected using the Individual Resources subscale of the Student Agency Scale (Jääskelä et al., 2017). The subscale has 28 items spread across four dimensions: participation activity, interest and motivation, self-efficacy, and competence beliefs. The questionnaire was translated into Persian, and semantic consistency with the original version was confirmed using the back-translation method. Subsequently, the face validity of tool was verified based on expert evaluations. Data analysis involved first- and second-order confirmatory factor analysis, convergent validity, Cronbach's alpha, composite reliability, and a one-sample t-test. Data analysis software included $SPSS_{19}$ and $Amos_{23}$.

Results: The first-order factor analysis results indicated that the questionnaire items (after removing three items) could appropriately describe the latent variables. The second-order factor analysis results also revealed that the questionnaire items could be reduced to four components: activity engagement, interest and motivation, self-efficacy, and competence beliefs (RMSEA: .047; CFI: .93). The average variance extracted was .55, confirming convergent validity. The overall Cronbach's alpha was .87, and the Cronbach's alpha coefficients for the subscales ranged from .64 to .82. The composite reliability was .82. Results also indicated a high level of individual agency among student-teachers at Farhangian University ($p < .05$).

Conclusions: Based on the findings, the psychometric properties of the Student Individual Agency Scale are satisfactory for the Iranian sample, and this scale can be used in future research to measure students' individual agency.

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Introduction

Individual agency is one of the key factors influencing students' learning and acquisition of professional and social competencies (Marín et al., 2020). Consequently, recent years have witnessed growing scholarly interest in investigating students' agency and its contributing factors (Goller & Paloniemi, 2017; Jääskelä et al., 2021; Leijen et al., 2021). However, research in this domain remains scarce in the context of Iranian higher education, primarily due to the lack of valid measurement tools for this construct.

Agency refers to individuals' capacity for self-regulation, making choices, and acting upon those choices to exert control over their lives and surroundings (Fosse, 2024). According to Brevik et al. (2019), individual agency entails the belief that learners are active participants in their own learning process, capable of making deliberate decisions and reflecting on the consequences of these decisions within their learning context. Infact, students' agency reflects how learners impose structure on their experiences during activities, interpret events, and assign meaning to their actions (Heikkilä et al., 2020). The most prominent psychological theory addressing individual agency is Bandura's (2006) social cognitive theory, which regards agency as a trait or capacity of an individual. As the founder of human agency theory in psychology and the main proponent of this theory, Bandura defines it as 'the human capability to make things happen through one's actions.' In this conception, agency is mostly determined by the personality and individual capabilities of a person, i.e., the level of their determination, specific knowledge, skills, or belief systems.

Despite the consensus among experts regarding the importance of students' individual agency, there is a dearth of research work in this aspect to date. One of the central reasons behind such a lack of empirical studies is the paucity of research focusing on the development and validation of agency measurement tools (Fosse, 2024). To fill the gap, Jääskelä et al. (2017) conducted a study titled *"Assessing University Students' Agency: Validation of the AUS Scale."* The study aimed to develop a quantitative research instrument for evaluating student agency in higher education. This study designed a self-report questionnaire to assess university students' agency in terms of individual, relational, and contextual aspects. It developed the pilot version in the 2010-2011 academic year and further refined and finalized it in 2013 within the framework of a university project titled 'Interactive Teaching and Learning' carried out at a Finnish university.

Although the developers of the tool identified three main components—individual, relational, and contextual—as sources of students' sense of agency, it seems that the relational and contextual components play the role of influential factors on agency and from a psychological perspective, it is the individual sources that represent the construct of agency in an individual. As Bandura's perspective suggests, agency is primarily dependent on an individual's personality and internal capacities. The concept of agency is also closely related to identity as an intrapersonal construct,

and from the perspective of individual identity, it refers to who the individual is and what active role they play in influencing realities (Leijen, 2023).

Despite the importance of the sense of individual agency in students' learning (Marín et al., 2020; Stenalt & Lassesen, 2022), it seems that students' agency has been overlooked in research conducted in Iran. Although a few limited studies have focused on validating certain scales, including moral agency (Abbasi Asl et al., 2019), agency in online education (Sheivandi, 2020), and human agency (Kiani et al., 2022), none have specifically examined or psychometrically evaluated a dedicated scale for measuring individual agency in university students. As mentioned before, a primary reason for the limited attention given to this important construct by Iranian researchers has been the absence of a valid measurement scale for assessing this variable. To fill this gap, the primary aim of the present study was to introduce and validate the 28-item students' individual agency scale. Moreover, the main focus of the present research was to develop a scale to assess the feeling of being constructive, significant, and effective as an intrapersonal variable – rather than assessing what they think in relation to external and situational variables influencing these variable. Accordingly, the present research adopted a psychological paradigm to investigate and validate the intrapersonal dimension of this scale and its subvariables through psychometric assessment.

Materials and Methods

Design and Participants

The research adopted a descriptive-correlational design. The statistical population of the study consisted of second-year and higher student-teachers at the BentolHoda Sadr and Shahid Modarres campuses of Farhangian University in Kurdistan Province, totaling 1,364 students (868 male and 496 female students). Based on Krejcie and Morgan's table, a total of 302 questionnaires were distributed among students using a systematic random sampling method. The systematic random sampling method was selected due to the availability of a population list arranged in alphabetical order without any inherent bias.

The sampling process was conducted as follows: After obtaining the necessary permits, the list of the target population was provided to the researchers. This list was alphabetically ordered, with rows 1 to 868 containing the details of male student-teachers and rows 869 to 1364 comprising female student-teachers. The sampling interval was calculated by dividing the total population size by the proposed sample size, resulting in a value of 4.5166. A random number between 1 and 5 (inclusive) was selected, which turned out to be 2, and this was designated as the first sampled unit. Subsequent units were determined by systematically adding the sampling interval, yielding the following sequence of selected entries: 7, 11, 16, 20, 25, 29, and so on. After approximately two months of follow-up, 275 questionnaires were returned in a complete and valid form (response rate

of 91%). However, during the data preparation process and with the aim of refining the factor analysis models of the study, four participants whose standardized scores exceeded the absolute value of 3 were excluded from the final analyses. So, the final analyses were conducted on a sample of 271 participants.

Instruments

The data collection tool was the individual resources dimension of the Student Agency Questionnaire (Jaskyla et al., 2017). It is notable that the final version of the Student Agency Scale (AUS) is a 54-item tool that was implemented on a sample of 239 students from various fields, including natural sciences, humanities, education, economics, psychology, sports, and health sciences, who were randomly selected at a university in Finland. This tool assesses agency in three categories: individual, relational, and contextual resources. Among these, the individual resource dimension of agency consists of 28 items and four subscales: participation in activities, interest and motivation, self-efficacy, and competence beliefs. Given the objective of the present study, this dimension and its four components were studied as the instrument for measuring student agency. The scale items are based on a five-point Likert scale (strongly disagree to strongly agree), and the scoring ranges from 1 to 5. The construct validity of the student agency scale was analyzed and confirmed through confirmatory factor analysis by Jaskela et al. (2017). Additionally, the reliability of the three subscales—interest and motivation, self-efficacy, and competence beliefs —was .87, and the reliability of the subscale of Participation Activity was reported as .91 (Jääskelä et al., 2017).

Procedure

In this study, the English version of the Student's Individual Agency Questionnaire was first given to three university professors from the fields of Educational Sciences, Educational Psychology, and English Language and Literature. Each of these professors translated the questionnaire, and then, in a joint meeting, their translations were discussed and reviewed to select the best translation for each item. In the next stage, the English and Persian versions of the questionnaire were provided to three English language specialists to ensure semantic consistency between the two versions. After making some minor adjustments, the semantic alignment was confirmed. Finally, the questionnaire was given to 10 student teachers of Farhangian University to identify and resolve any potential ambiguities. In this stage, after applying some minor changes, the clarity and comprehensibility of the questionnaire were ensured.

In the fourth stage, the face validity of the questionnaire was confirmed by five professors in the fields of psychology and educational sciences. Finally, the reliability of the questionnaire was assessed by administering it to 30 individuals from the statistical population and calculating the Cronbach's alpha coefficient. The overall Cronbach's alpha coefficient for the scale was .84.

Additionally, this coefficient for the dimensions of participation in activities, interest, and motivation, self-efficacy, and competence beliefs was .81, .74, .79, and .61, respectively. For data analysis, first- and second-order confirmatory factor analysis, convergent validity (average variance extracted), Cronbach's alpha coefficient, and one-sample t-test were used. SPSS version 19 and Amos version 23 software were utilized for these analyses.

Results

To examine the factor structure of the Student Individual agency Scale, both first-order and second-order confirmatory factor analyses were conducted. Before performing these analyses, several steps were taken to prepare the data and ensure that the prerequisites for factor analysis were met. In the first step, the raw scores of the participants were transformed into standardized scores, so that any participants whose standardized scores were more than three standard deviations above or below the mean could be excluded from the analysis. Since the preliminary analysis of the conceptual model indicated that improvements were needed in the goodness-of-fit indices, four participants whose standardized scores exceeded an absolute value of 3 were excluded from the final analysis to delete the outliers data. Outliers are scores that are very different from the rest. A univariate outlier is a score that is extreme on a single variable. There is no single definition of “extreme,” but one heuristic is that scores more than three standard deviations beyond the mean may be outliers. Univariate outliers are easy to find by inspecting frequency distributions of Z scores (e.g., $|Z| > 3.0$ indicates an outlier) (Kline, 2023). In the second step, the Kolmogorov-Smirnov test was used to check the normality of the data distribution. The results indicated that the Z statistic was .715, and the significance level was .687 ($p > .05$). Given that the Z statistic was not significant, the null hypothesis of normality of the data distribution was confirmed.

During both first-order and second-order confirmatory factor analyses, the skewness and kurtosis of the observed variables were examined. Since the skewness and kurtosis values of all observed variables were less than the absolute value of 3, the normality of the variables was confirmed. Another prerequisite that was examined was the sample adequacy for performing factor analysis. To assess this prerequisite, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's sphericity test were used. The KMO statistic was .846, which is greater than .7. Therefore, it was concluded that the research data could be reduced to a number of underlying and latent factors. The chi-square statistic in Bartlett's test was 2461.50, with 378 degrees of freedom and a significance level of .001 ($p < .05$). Given the significance of the chi-square value, it was determined that there is a high correlation among the items within each underlying factor, while no specific correlation was observed between the items of one factor and those of other factors.

Based on the results of the KMO and Bartlett tests, the sample adequacy for performing factor analysis was confirmed. Finally, as the last step in data preparation, the factor loadings of the items

were examined. The results revealed that the factor loading of item number 28 was only .22, so this item was excluded from the final analyses. After preparing the data, first-order and second-order confirmatory factor analyses were conducted based on the maximum likelihood estimation method. It is worth noting that during the confirmatory factor analysis, the t-values corresponding to the factor loadings of items 25 and 27 were also not significant, so these two items were excluded from the final analyses. Additionally, to improve the model's fit indices, the covariance between the residuals within each factor was added. The first-order and revised confirmatory factor analysis model of the study is presented in Figure 1 and Table 1.

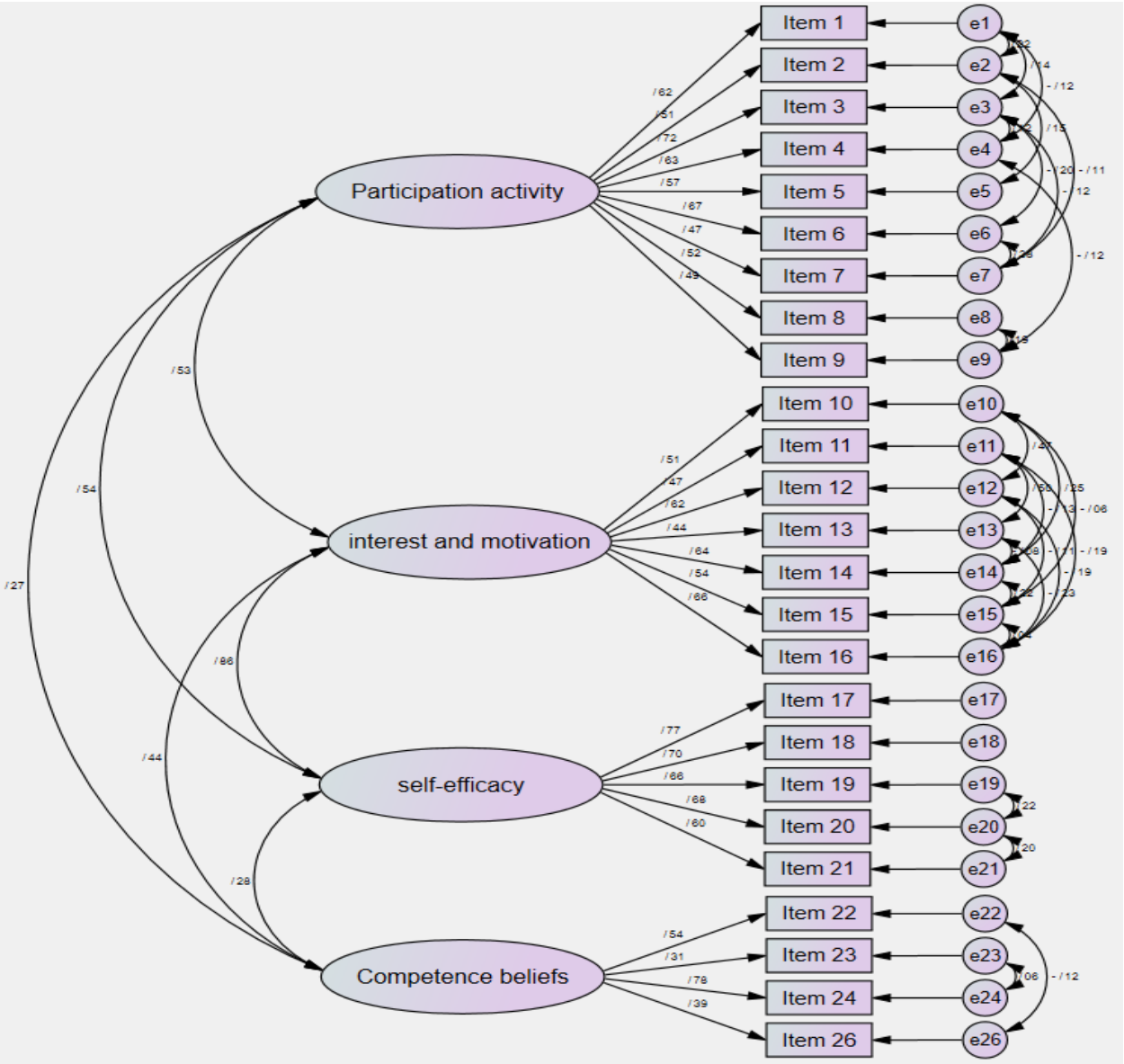

Figure 1. The Modified model of First-order Confirmatory Factor Analysis

Table 1. Factor Loadings and T-Values of the Items in First-order Confirmatory Factor Analysis

Dimension	Item	Beta	t
Participation Activity	1) I ask questions and make comments in class.	0.615	-
	2) I easily express my opinions in class.	0.509	7.37
	3) I am responsible and an active participant.	0.723	8.88
	4) I enjoy innovative activities and actively participate in these topics.	0.628	7.29
	5) I express my thoughts and views without fear of ridicule.	.570	7.17
	6) Participating in discussions is easy for me.	.671	7.82
	7) Participating in discussions is difficult for me.*	.465	5.94
	8) Even when I am busy with another activity, I welcome participation in discussions.	.517	6.68
	9) I have the courage to challenge topics presented in class.	.490	6.35
Interest and Motivation	10) My major does not excite me.*	.508	-
	11) I am highly motivated to study my subjects.	.468	5.85
	12) Studying this major is not interesting to me because its importance is unclear.*	.623	8.94
	13) The content of the course materials and textbooks is appealing to me.	.444	5.37
	14) I am interested in succeeding in my major.	.641	7.85
	15) I like learning with the intent to understand.	.535	5.89
	16) I maintain persistence and perseverance in tasks that require great effort.	.655	6.80
Self-Efficacy	17) I believe in my ability to succeed in my major.	.768	-
	18) Even in the most difficult assignments, I have faith in my success.	.696	10.84
	19) I believe I will successfully complete my studies.	.658	10.15
	20) I believe I will achieve the personal goals I have set for my major.	.676	10.36
	21) Despite difficulties, I believe in myself as a successful learner.	.596	9.18
Competence Beliefs	22) I understand the course content.	.541	-
	23) I have enough knowledge to participate in academic discussions.	.313	2.86
	24) I learn the fundamental concepts related to my major well.	.781	4.33
	25) The course content is too difficult for me. *	Removed	Removed
	26) I lack sufficient foundational knowledge to understand the course material.	.391	4.45
	27) Due to the difficulty of the material, I always have to review prior content. *	Removed	Removed
	28) The assignments are within the student's capacity and the expectations are reasonable.	Removed	Removed

*Items with reverse scoring.

Based on the results in Table 1, the factor loadings for the indicators of the Participation Activity dimension ranged from .46 to .72. The factor loadings for the indicators of the Interest and Motivation dimension ranged from .44 to .65. For the Self-Efficacy dimension, the factor loadings for the indicators ranged from .60 to .77, and finally, the factor loadings for the indicators of the Competence Beliefs dimension ranged from .31 to .78. As mentioned earlier, in order to improve the model fit, items 25, 27, and 28 were removed. The t-values corresponding to the factor loadings of the remaining items were greater than 1.96, indicating that these indicators can serve as appropriate descriptors for the four underlying dimensions they represent.

To evaluate the validity of the first-order factor analysis model, goodness-of-fit indices were considered. Notably, the chi-square statistic was 384.219 with 242 degrees of freedom, and the significance level was .001. As shown in Table 2, all the fit indices, except for the Adjusted Goodness of Fit Index (AGFI), indicate an acceptable fit for the modified model of the study.

Table 2. Goodness-of-Fit Indices for the First-Order Factorial Validity of the Student Individual agency Scale

Index	Abbreviation	Fit Criterion	Index Value
Chi-Square to Degrees of Freedom Ratio	X^2/df	< 3	1.59
Root Mean Square Error of Approximation	RMSEA	< .08	.047
Comparative Fit Index	CFA	≥ .90	.93
Incremental Fit Index	IFI	≥ .90	.93
Tucker-Lewis Index	TLI	≥ .90	.92
Goodness of Fit Index	GFI	≥ .90	.90
Adjusted Goodness of Fit Index	AGFI	≥ .90	.87
Parsimony-Corrected Fit Index	PCFI	≥ .50	.75
Parsimony-Corrected Normed Fit Index	PNFI	≥ .50	.68

After it was determined that the observed variables, or the questions forming the scale, were adequately loaded onto the latent variables, or the four dimensions, confirmatory factor analysis of the second order was conducted to examine whether the student agency variable could be reduced to the four factors of participation activitiy, interest and motivation, self-efficacy, and competence beliefs.

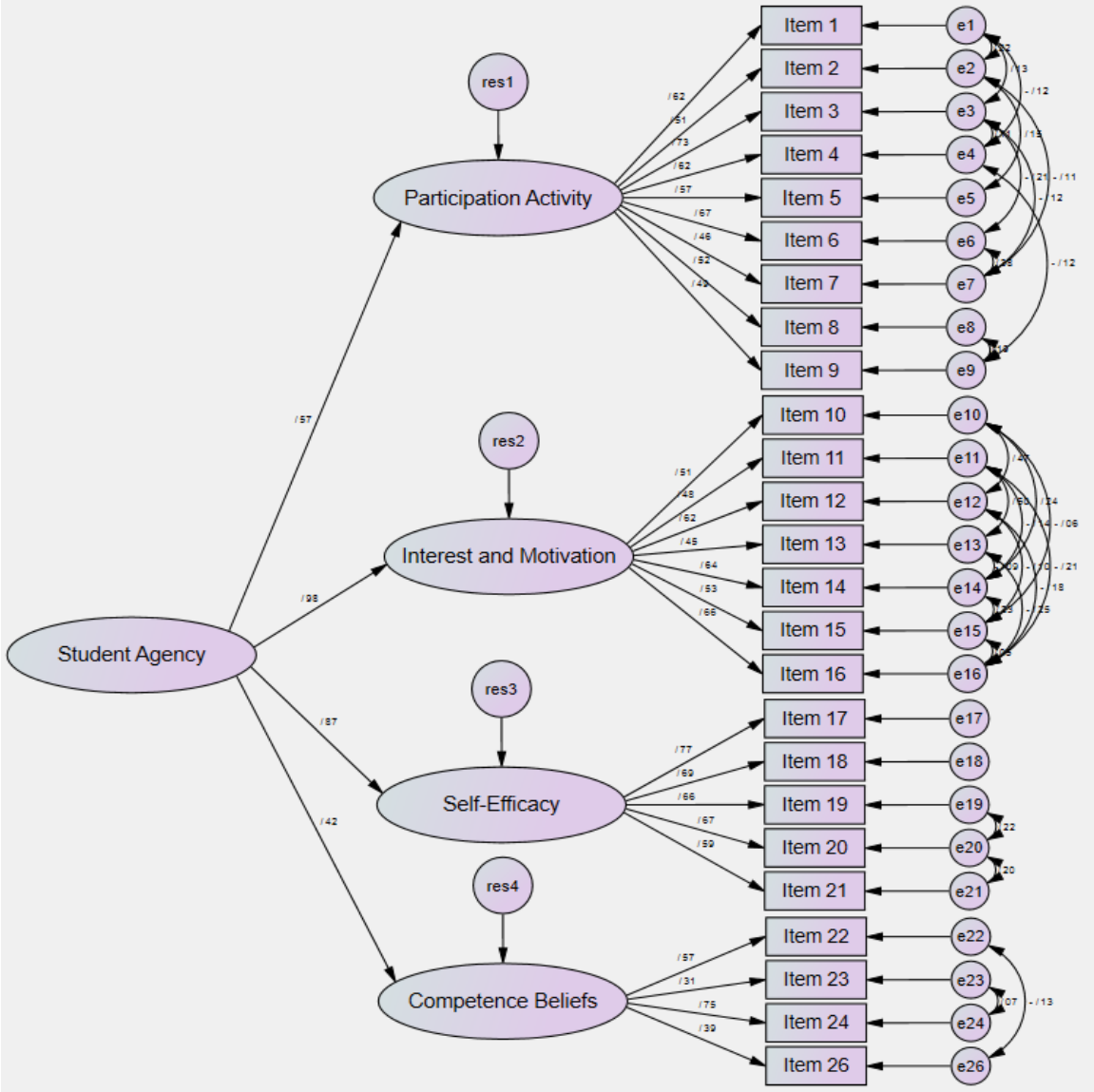

Figure 2. The Modified Model of Second-order Confirmatory Factor Analysis

In Figure 2, the output of the second-order confirmatory factor analysis of the student individual agency scale is presented. Additionally, in Table 3, a summary of the results of the second-order confirmatory factor analysis is reported. ‹he values of the chi-square statistic, degrees of freedom, and significance level in the observed model were 389.984, 244, and .001, respectively.

Table 3. Summary of Second-order Confirmatory Factor Analysis

Total Variable	Dimension	Beta	t	Fit Indices		
				Indices	Criteria	Value
Individual Agency	Participation Activitiy	.57	6.72	X^2/df	< 3	1.60
	Interest and Motivation	.98	7.48	RMSEA	< .08	.047
				CFA	≥ .90	.93
				IFI	≥ .90	.93
	Self-Efficacy	.87	10.96	TLI	≥ .90	.92
				GFI	≥ .90	.90
				AGFI	≥ .90	.87
	Competence Beliefs	.42	4.02	PCFI	≥ .50	.76
				PNFI	≥ .50	.68

Based on the results in Table 3, the factor loadings of the dimensions on the student individual agency construct ranged from .42 to .98. Since the t-values corresponding to the factor loadings are higher than 1.96, it can be concluded that the four dimensions are adequately loaded onto the student agency construct and provide an appropriate description of this construct. Further examination of the goodness-of-fit indices reveals that, similar to the first-order confirmatory factor analysis, all indices, except for the AGFI, indicate an acceptable fit for the observed model. These results suggest that the items of the student individual agency scale can be reduced to four components of participation activitiy, interest and motivation, self-efficacy, and competence beliefs. However, the confirmation of the factor structure of the scale was achieved by removing items 25, 27, and 28.

After conducting the confirmatory factor analysis of the student individual agency scale, the next step was to calculate the convergent validity, reliability, and composite reliability of the scale. To assess convergent validity, the Average Variance Extracted (AVE) was used, which in this study was .55. Since the AVE value was greater than .50, the convergent validity of the scale was confirmed. The overall reliability of the scale, based on Cronbach's alpha coefficient, was .87, which is considered acceptable. The Cronbach's alpha values for the dimensions of participation activitiy, interest and motivation, self-efficacy, and competence beliefs were .82, .77, .82, and .64, respectively. Finally, the composite reliability of the student individual agency scale was .82, which is considered acceptable.

After confirming the validity and reliability of the student individual agency scale, the agency status of student teachers in the Kurdistan province’s Colleges of Farhangian university was examined based on the 25-item validated scale.

Table 4. Results of One-Sample t Test for Examining the Level of Student Teachers' Individual Agency

Variable	N	M	S D	t	df	Sig.
Participation Activity	271	3.70	.65	17.70	270	.001
Interest and Motivation	271	3.85	.69	20.44	270	.001
Self-efficacy	271	4.16	.67	28.57	270	.002
Competence Beliefs	271	3.84	.66	21.07	270	.001
Individual agency	271	3.89	.52	28.21	270	.001

The results in Table 4 indicate that the mean agency score of student teachers was 3.89, with a standard deviation of .519, a t-statistic of 28.21, and a significance level of .001. Given the positive and statistically significant t-statistic, it can be concluded that the sense of individual agency among the student teachers is significantly higher than the average. Examination of the dimensions of individual agency reveals that the self-efficacy dimension, with a mean of 4.16 and a standard deviation of .668, scored the highest.

Discussion

This study aimed to validate the Student Individual Agency Scale. The results confirmed the scale's factor structure, which comprises four distinct components: participation activity, interest and motivation, self-efficacy, and competence beliefs. These findings are consistent with the results of Jääskelä et al. (2017), who indicated that the individual resources of student agency consist of these four components. Additionally, in the studies by Jääskelä et al. (2020) and Jääskelä et al. (2023), these components were also considered as the Individual resources of agency, and their validity was confirmed through Confirmatory Factor Analysis.

The results of this study, which validate the factor structure of the Individual Agency Scale for Students, can be explained based on Bandura's theories who perceives human agency as the individuals' capacity to influence the processes of events through their actions. Bandura focuses on avoiding passivity and active engagement which can be fulfilled via Participation Activity. Furthermore, Bandura asserts that an individuals' beliefs play a crucial role in determining their sense of agency. Individuals who believe in their abilities exhibit greater effort and perseverance in completing tasks and engage more actively in various activities compared to those who doubt their own capabilities (Aghakhanbabaei et al., 2016).

This indicates that the basis for engaging in activities and and influencing the environment lies in possessing self-efficacy and competence beliefs and a comprehensive definition of individual agency cannot be achieved without considering one's cognitive capacities and their positive beliefs about personal abilities and competencies. Ultimately, it is also evident that there is a relationship between an individual's competency beliefs and self-efficacy with their interest and motivation for participating in activities; in such a way that Participation Activity requires having an interest and motivation to engage, and interest and motivation are influenced by self-efficacy and competency beliefs. Therefore, it seems that a comprehensive and precise definition of individual agency should encompass the four components of activity participation, interest and motivation, self-efficacy, and competence beliefs.

Another finding of the present study was the high level of perceived individual agency among students at Kurdistan Farhangian University. Various factors, such as the nature of the university's curriculum, student-teachers' successful experiences in the national entrance exam, and other

relevant aspects, can be considered in explaining these results. Regarding the curriculum of Farhangian University, many courses are offered in either practical or theoretical-practical formats. The inherently interactive nature of practical courses provides students with greater opportunities for participation, expression, and active engagement. Therefore, this likely contributed to the improvement of both the sense of agency and the feeling of impact among the student teachers. Moreover, student teachers at Farhangian University are selected from among students who have demonstrated academic excellence and achieved top ranks in the national university entrance exam. Consequently, their consistent academic success has likely reinforced their sense of competence, self-efficacy, and enthusiasm for academic activities. Therefore, it seems reasonable that they report a high level of Individual agency.

Conclusion

The results of this study showed the validity of the factor structure of the Individual Agency Scale for Students. Bandura (2006) defines human agency as "the capacity of individuals to influence their performance and the processes of events through their own actions." A key element of this definition is the emphasis on avoiding passivity and focusing on active engagement, as it is through Participation Activity that individuals can exert influence on their environment. Consequently, it can be inferred that higher levels of engagement in academic activities reflect a strong sense of academic agency. In other words, an individual's agency is expressed through their participation, and involvement in activities serves as a manifestation of individual agency.

However, these findings may have been influenced by certain limitations, such as participants' tendency to present themselves favorably (social desirability bias) and potential environmental effects during data collection. Therefore, these constraints should be considered when evaluating and utilizing the results. Moreover, the study was geographically limited to student teachers at Farhangian University in Kurdistan Province. To enhance the generalizability of the questionnaire, future research should administer this instrument to more diverse samples of Iranian students. It is also important to note that this study only validated the individual agency dimension of scale developed by Jääskelä et al. (2017).

Furthermore, Based on the study findings, the validity and reliability of the student individual agency scale were confirmed in the examined Iranian sample. Therefore, this scale can be utilized in future research to measure individual agency among various student groups and to investigate the status of this important and influential construct in learning across Iranian student populations.

Author Contributions

All authors contributed significantly to this study.

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Ethical considerations

During the data collection process, ethical considerations such as obtaining legal permissions, securing the informed and voluntary consent of student-teachers for participation in the study, and maintaining the confidentiality of participants' information were upheld by the researchers.

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Conflicts of interest

The authors declare no conflicts of interest.

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