MOTIVATION MUSIC INVENTORY RELIABILITY AND VALIDITY, FOR A ROMANIAN VERSION, IN A LARGE STUDENT SAMPLE

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Abstract: *The present study sought to investigate second time the MUSIC inventory reliability and structure validity but, in a larger sample. Published research using multiple samples indicated that MUSIC inventory had excellent Cronbach's Alpha values for each scale and the structure validly was considered acceptable by more authors, even there have been found higher correlations between its scales. The hypothesis was that the students' perceptions measured using MUSIC inventory would prove the reliability and construct validity of the translated version. The sample of this study consisted of a voluntary group of 215 students, mainly enrolled in the Master's Programs: Educational Management - first and second year and Psychopedagogy of Early Education - first and second year. The study had a cross-sectional design. The structure of the study is similar to the previous one, with the intention to make their results comparable. Also, the same statistical analyses were performed: reliability analysis (Cronbach's Alpha), factor analysis and correlation analysis. Interpretation of results from this study suggested that the hypothesis of the study was again only partially confirmed, reliability was proved by Cronbach Alpha coefficients to be excellent (between ,946 - ,970) for all scales. Related to the construct validity of the inventory, results not confirmed the theoretical structure. Due to high correlation among all MUSIC items, inventory theoretical structure is susceptible not working properly in all samples.*

Key words: *MUSIC inventory; motivation; reliability; validity.*

Background

Intrinsic and extrinsic motivation are the main factors that guide pupils academic behavior and has significant impact on improving their academic results (Afzal & Ali, 2010).

The specific literature on this topic is well represented and most studies' findings suggest that motivation in school has a positive effect on academic results. Because of this, numerous authors were working on the development of motivation scales. Some of most known of them are:

Ryan and Deci (intrinsic motivation), Guay, Vallerand and Blanchard (Situation Motivation Scale), Harter (Scale of Intrinsic Versus Extrinsic Orientation in the Classroom) (Nortje, 2021). Motivation dimensions were also studied in a recent small qualitative research (Kiliç et al., 2021). Main findings from this research suggest that there are four dimensions that influence children motivation in class. These dimensions (in the order mentioned by authors) are: learning teaching, lessons characteristics, evaluation, environment material factors. As can be seen, academic literature related to motivation is abundant (Wentzel & Ramani, 2016) and many new other scales or questionnaires for motivation assessment are still proposed. One of them is the MUSIC inventory developed by Brett D. Jones (Jones, 2022). More studies published results that confirm the good validity of the Music Inventory (Jones et al., 2019, 2021; Jones & Sigmon, 2017; Jones & Skaggs, 2016, Jones & Wilkins, 2023; Pace et al., 2016). In a previous study on a smaller sample the structure of this inventory was verified using more statistical analyses, among them: Cronbach Alpha, Factor Analysis (Igna, 2023). Results from this study suggested that the hypothesis of the study was only partially confirmed, reliability was proved by excellent or good Cronbach Alpha coefficients (above 0.9) for Usefulness and Interest scales, (between 0.7-0.9) for the remaining three scales, but, on the other hand, construct validity of the inventory was not confirmed. One explanation for this result was speculated that could be the small number of people that were in the sample. In the present study the sample size is much bigger so the previous limitation is overcome. The structure of the study is similar to the previous one, with the intention to make their results comparable. Validity and reliability are important aspects for every questionnaire and should be a matter of concern for every author (Bolarinwa, 2015).

Hypothesis
Students' perceptions measured using MUSIC inventory would prove the reliability and construct validity of the translated version applied to 215 Romanian students.

Research Methods
Sample
It consisted of 215 people, with an average age of 34.27 years (SD = 9,670); minimum age was 21 years and maximum 55 years, the group included 204 females and 11 males, students in the Master's Programs: Educational Management - first and second year and Psychopedagogy of Early Education - first and second year and three students in the field of science of education. These individuals' classes were invited to complete the questionnaire of this research. The questionnaire was

electronically distributed by Google Forms.

	Specializarea							Total
	ME anul 1	ME anul 2	PETSM anul 1	PETSM anul 2	PIPP anul 1	PIPP anul 2	PIPP anul 3	
Sex Feminin	67	42	36	56	1	1	1	204
Masculin	6	3	0	1	0	0	1	11
Total	73	45	36	57	1	1	2	215

Table 1. Sex * Specialization Crosstabulation

Instruments

The MUSIC inventory proposes a motivation model with five main components: empowerment, utility, success, interest and care. The MUSIC motivation model (Jones, 2009, 2018) can be used in any field at any class level. Later, the inventory was modified and were developed shorter versions (of 20 or 19 items) but in this study the original 26 items inventory was used. The inventory uses a 1to 6 rating scale (from „Strongly disagree" to „Strongly agree"), each number being associated a verbal description. Each principle is measured by a number of items:

- Empowerment score = (item 2 + item 8 + item 12 + item 17 + item 26) / 5
- Usefulness score = (item 3 + item 5 + item 19 + item 21 + item 23) / 5
- Success score = (item 7 + item 10 + item 14 + item 18) / 4
- Interest score = (item 1 + item 6 + item 9 + item 11 + item 13 + item 15) / 6
- Caring score = (item 4 + item 16 + item 20 + item 22 + item 24 + item 25) / 6

The inventory was used in several large studies (Jones et al., 2021, 2022; Jones & Wilkins, 2023) and also in recent ones (Resendiz-Calderón et al., 2024; Suzuki et al., 2024)

For this research the MUSIC inventory was translated by two translators in Romanian; these translations were merged through a synthesis by a committee (two translators, previously mentioned, and an expert in the field) and finally, the Romanian version was translated again in English by another translator and a second expert in the field.

Research design

This study follows a cross-sectional design.

Results

 More analyses were needed to test the hypothesis, in order to perform

them it was necessary that answers from the survey be converted into numerical variables (for conversion was used the table from Instructions, Annex 1) and scores for all five principles/scales calculated (details in „Instruments"). These calculated scores were used in the descriptive statistics, reliability analysis, factor analysis and in the correlation analysis.

		Empowerment score	Usefulness score	Success score	Interest score	Caring score
N	Valid	215	215	215	215	215
	Missing	0	0	0	0	0
Mean		5,2763	5,4549	5,3674	5,4395	5,5977
Median		5,4000	5,8000	5,5000	5,8333	6,0000
Mode		6,00	6,00	6,00	6,00	6,00
Std. Deviation		,82402	,84575	,80803	,86390	,84326
Minimum		1,00	1,00	1,00	1,00	1,00
Maximum		6,00	6,00	6,00	6,00	6,00

Table 2. Descriptive Statistics for the 5 scales of the MUSIC inventory

	N	Cronbach Alpha	Number of items
Empowerrment score	215	,949	5
Usefulness score	215	,957	5
Success score	215	,946	4
Interest score	215	,970	6
Caring score	215	,963	6
All 26 questions	215	,988	26

Table 3. Reliability Statistics - Cronbach's Alpha

In this study were used same criteria as those provided by Kline (2016) to evaluate the alpha values of the five MUSIC scales: above 0.9 / excellent, 0.7 - 0.9 / good, between 0.6 -0.7 / acceptable, and below 0.6 / unacceptable.

In order to test the hypothesis, each scale of the MUSIC inventory was analysed with Reliability analysis (Cronbach Alpha). A separate Reliability analysis was performed, including all 26 items; and, for this last analysis the Cronbach Alpha value obtained was ,988 (last row in Table 3).

	Component	
	1	2
TM_1_nr	**,864**	-,261
TM_2_nr	**,793**	,217
TM_3_nr	**,888**	-,140
TM_4_nr	**,867**	-,195
TM_5_nr	**,884**	-,132
TM_6_nr	**,904**	-,163
TM_7_nr	**,893**	,132
TM_8_nr	**,858**	,309
TM_9_nr	**,931**	-,066
TM_10_nr	**,867**	,217
TM_11_nr	**,895**	-,015
TM_12_nr	**,844**	,383
TM_13_nr	**,918**	-,041
TM_14_nr	**,823**	,326
TM_15_nr	**,920**	-,134
TM_16_nr	**,912**	-,148
TM_17_nr	**,880**	,328
TM_18_nr	**,892**	,239
TM_19_nr	**,930**	-,035
TM_20_nr	**,920**	-,094
TM_21_nr	**,899**	-,004
TM_22_nr	**,903**	-,174
TM_23_nr	**,879**	-,110
TM_24_nr	**,838**	-,220
TM_25_nr	**,853**	-,278
TM_26_nr	**,869**	,132

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Table 4. Factor analysis for the MUSIC inventory scales - Component Matrix

The factor analysis or the MUSIC inventory was performed without specifying in the analysis to be done for 5 factors (as its theoretical model indicates); the analysis identified only 2 components/factors. First factor had the highest load for each item.

		Empowerment_ score	Usefulness_s core	Success_s core	Interest_s core	Caring_s core
Empowerm ent score	Pearson Correlat ion	1	,869**	,901**	,859**	,834**
	Sig. (2-tailed)		,000	,000	,000	,000
	N	215	215	215	215	215
Usefulness _ score	Pearson Correlat ion	,869**	1	,882**	,945**	,918**
	Sig. (2-tailed)	,000		,000	,000	,000
	N	215	215	215	215	215
Success score	Pearson Correlat ion	,901**	,882**	1	,866**	,851**
	Sig. (2-tailed)	,000	,000		,000	,000
	N	215	215	215	215	215
Interest score	Pearson Correlat ion	,859**	,945**	,866**	1	,925**
	Sig. (2-tailed)	,000	,000	,000		,000
	N	215	215	215	215	215
Caring Score	Pearson Correlat ion	,834**	,918**	,851**	,925**	1
	Sig. (2-tailed)	,000	,000	,000	,000	
	N	215	215	215	215	215

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5. Correlations for the MUSIC inventory scales

Correlation analysis between the 5 Scales of MUSIC inventory indicated positive and statistically significant relationships among all scales.

A second Correlations analysis was performed (table not presented), including responses from all 26 items of the MUSIC inventory, all correlations were positive and statistically significant, the same as the correlations between MUSIC inventory scales (Table 5).

Discussion

Hypothesis of this study is only partially confirmed; in this study, the same as in other previous ones, the MUSIC inventory proved to be a reliable questionnaire. The Cronbach Alpha coefficients are excellent (above 0.9) for all scales (see Table 3). But, the same as in the previous study that used a smaller sample of Romanian students, the construct validity of the inventory is not confirmed.

The same as in the previous study on the Romanian students and differently from other studies (Jones et al., 2019) in this study, correlation coefficients are much higher. A separate correlation analysis was performed to assess the relationship among all items. As already mentioned in the results, all correlations between all items were positive and statistically significant.

In the previous study the factor analysis indicated only four factors but, in this study, the same analysis indicated only two factors and, only the first factor encompassed the highest load from each item (see Table 4). The statistical software has the option to impose a specific number of scales/components but this option was not used during the statistical analysis because its purpose was to check if the 5-scale structure would result without imposing it as a condition. If the condition was imposed, to check for 5 scales (the analysis was performed but the table not included in this paper), still the first factor presented the highest load for all items and results not supported the theoretical structure of the MUSIC inventory. Also, in this study some items seem to be problematic because have a high load on both factors (example: items 8, 12, 14, 17).

In this study, that used a sample of Romanian students, the same as in the first study that used a similar but smaller sample, correlation analysis and factor analysis results cannot be used as arguments to support the expected construct validity of the MUSIC inventory. One explanation for these results could be the behavior of this sample. Looking at the values of mean, mode and median available in Table 2 can be observed that these values are at the maximum (mode) or close to it (mean and median). Because the translation was carefully accomplished by a grup of translators and two specialists in this area, remains as a further study verify if on a different sample results could confirm the construct validity of the MUSIC inventory.

Conclusion

Considering previous studies, The MUSIC inventory is considered an

reliable instrument that has good reliability and structure validity but, in both studies on the Romanian sample the structure validity was not confirmed. Although it is an instrument easy to apply, its use perhaps could be useful, just as a measure of precaution, to be followed by a factor analysis, before trying to analyse the relationships between scores of MUSIC scales and other variables.

MUSIC Inventory, Annex 1
- To be administered while the student is enrolled in college
- Use the instructions below. Title the survey following the directions in a prior page of this User Guide. Also, use the directions on a prior page for how to format the 1 to 6 scale.

Instructions

Thinking about the [insert name of major or program] courses you have taken and are currently taking in your academic major (i.e., [insert specific majors]), please rate your level of agreement or disagreement with the following statements using the following scale:

1	2	3	4	5	6
Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree

There are no right or wrong answers for these questions. Please answer them honestly. Some of the questions might seem repetitive, but it is important that you answer them all to obtain the best possible results.

Also, note that the word "coursework" refers to anything that you did in these courses, including assignment, activities, readings, etc.

_____ 1. The coursework holds my attention.

_____ 2. I have the opportunity to decide for myself how to meet course goals.

_____ 3. In general, the coursework is useful to me.

_____ 4. The instructors are available to answer my questions about the coursework.

_____ 5. The coursework is beneficial to me.

_____ 6. The instructional methods used in the courses hold my attention.

_____ 7. I am confident that I can succeed in the coursework.

_____ 8. I have the freedom to complete the coursework my own way.

_____ 9. I enjoy the instructional methods used in the courses.

_____ 10. I feel that I can be successful in meeting the academic challenges in the courses.

_____ 11. The instructional methods engage me in the courses.

_____ 12. I have options in how to achieve the goals of the courses.

_____ 13. I enjoy completing the coursework.

_____ 14. I am capable of getting a high grade in the courses.

_____ 15. The coursework is interesting to me.

_____ 16. The instructors are willing to assist me if I need help in a course.

_____ 17. I have control over how I learn the course content.

_____ 18. Throughout the courses, I have felt that I could be successful on the coursework.

_____ 19. I find the coursework to be relevant to my future.

_____ 20. The instructors care about how well I do in their courses.

_____ 21. I will be able to use the knowledge I gain in the courses.

_____ 22. The instructors are respectful of me.

_____ 23. The knowledge I gain in the courses is important for my future.

_____ 24. The instructors are friendly.

_____ 25. I believe that the instructors care about my feelings.

_____ 26. I have flexibility in what I am allowed to do in the courses.

(Jones, 2022)

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