

Improving women motivation in learning Physics

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Abstract. We want to analyze the motivations in the study of physics in pre-university educational levels. 69 undergraduate students who learnt with a Brain-Based Teaching Approach (BBTA) methodology (Socratic style) were compared to a sample with the same N who had learnt in a masterclass style. Both groups were analysed through Academic Motivation Scale (AMS). T-test and U Mann-Whitney analysis suggest amotivation is the same in both groups, but extrinsic motivations are higher in the classic style group, while the intrinsic motivations are higher in the Socratic one, specially for women ($p < 0,032$). To learn Physics in the proposed way seems to reinforce intrinsic motivations.

1 Introduction

It is necessary to find relationships between Physics and other branches of knowledge, such as Mathematics, Biology, Philosophy, History [1], Geography and Music, among others. Transversality is inherent in the process of acquiring knowledge. Thus, the BBTA applied is based on the implication of the students in their own learning process [2].

2 Methods

The AMS test is used in this study. Vallerand et al. [3] suggested three factors for intrinsic motivation: the intrinsic motivation to know (IMTK) which means that the student performs the activity for the pleasure that they feel when they got a new learning; the intrinsic motivation to accomplish (IMTA) which means that the student interacts with the environment to feel competent; and Intrinsic Motivation to Experience Stimulation (IMES) which means the student engages in the assignment to experience stimulating. The three factors of intrinsic motivation exist in the continuum of self-determination, but they are factors of intrinsic motivation with a correlation between each other. Three factors for the extrinsic motivation are extrinsic motivation for external regulation (EMER) which means that the student performs the activity in order to get external reinforcement, extrinsic motivation for introjected regulation (EMIN) which means that the student begins to personalize his actions and reasons, extrinsic motivation for identified regulation (EMID)

which makes the behaviour valuable and important for the student, and one factor for the Amotivation (AMOT) which means that the student does not have intrinsic or extrinsic motivation.

3 Results

Table 1. Kurtosis-Symmetry (K-S) and Shapiro-Wilk (S-W) normality tests (p-values) of women samples, T-test (parametric) / U Mann-Whitney test (non parametric)

	BBTA method		Classic method		T test	U Mann-Whitney test
	K-S	S-W	K-S	S-W		
IMTK	.142	.092	.077	.368	.032	
IMES	.282	.241	.856	.626	.199	
IMTA	.814	.893	.198	.051	.868	
AMOT	.046	.000	.005	.000		.686
EMER	.328	.293	.008	.000	.000	.000
EMID	.087	.051	.013	.000	.013	.019
EMIN	.619	.620	.278	.522	.012	

4 Conclusion

In light of the results obtained, the BBTA group has fewer extrinsic motivations than the classic group and more intrinsic motivations, especially for the pleasure of learning. Women from the BBTA group show significantly higher interest in learning Physics than women from the classic group. This BBTA method could be a strategy to follow in order to involve women in Science.

References

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