

BAR-ILAN UNIVERSITY

**Experiences and Perceptions of Teachers and
Students Who Have Experienced the Multi-Faceted
Holistic Approach Model in Science and
Technology Heterogenic Classes**

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Abstract

The present study examined the impact of applying the Multi-Faceted Holistic Approach (MuFHA) in science instruction in the inclusive classroom. The MuFHA refers to each student in the classroom as a whole learner relating to four dimensions of functioning: cognitive, emotional, social and sensorimotor. This approach is applied through a variety of teaching and learning methods, so that each student will meet his/her preferences in the learning processes.

The purpose of this study was to reveal the experiences and perceptions of teachers and students who have experienced the MuFHA in science and technology classes, and to determine the degree of meeting the students' needs and teachers' needs, based on the approach's four dimensions: cognitive, social, emotional and sensorimotor.

The research sample included 104 9th grade students from two middle schools. This research sample included students with different background characteristics: gender, diagnosis of learning disabilities, and level of achievement in science. The teacher population in this study included six teachers who participated in a 30-hour advanced professional development training course, in which they were exposed to the MuFHA and examples for implementation of the approach in the science classroom. The course focused mainly on multi-faceted teaching, working in small groups and developing meta-cognitive awareness. The teachers who applied the MuFHA instructional methods as part of their ongoing work plan and their students in the science classroom constituted the intervention group. Teachers who did not apply the MuFHA instructional methods and their students in the science classroom, constituted the comparison group of this study.

This study applied a mixed-methods approach, including quantitative and qualitative research tools. The starting point of this study was the Learning Preferences questionnaire, which examined students' learning preferences, using a quantitative methodology. The questionnaire included 44 items that represented different learning preferences. We then examined whether the diverse preferences revealed in the questionnaire were indeed fulfilled, by combining interviews with student focus groups, observations of science lessons, and interviews with the teachers who participated in this study, which were analyzed using a qualitative methodology. The combination of the quantitative paradigm and the qualitative paradigm enabled to draw general conclusions from the data.

We hypothesized that there would be a statistical correlation between students' personal background data such as gender, diagnosis of learning disabilities and level of achievements in science studies, and the way they prefer to learn science. The first research hypothesis was that girls would prefer more tasks that require collaboration with others than competitive tasks and would prefer mediated learning that is processed and anchored within the classroom setting, compared to boys. The study findings showed that partial confirmation of the first study hypothesis was revealed. According to our hypothesis, it was found that girls are more likely to

prefer learning that includes internal, personal, information processing and express more need for information mediation compared to boys. No significant differences were found between the boys and the girls relating to other categories of the Learning Preferences questionnaire. The second research hypothesis, which was also partially confirmed, was that students with learning disabilities would prefer hands-on activities, they would prefer to study alone rather than in groups and will demonstrate a need for information mediation. It was found that students with learning disabilities preferred sensorimotor learning compared to students without learning disabilities. No significant differences were found between students with and without learning disabilities relating to other categories of the Learning Preferences questionnaire. Moreover, we hypothesized that high-achieving students will prefer visual learning compared to low-achieving students. The findings of the study indicated that low-achieving students preferred social learning compared to high-achieving students. No significant differences were found between low and high achievers relating to other categories of the Learning Preferences questionnaire.

The qualitative data analysis of the current study shows that in the intervention group who experienced MuFHA based science instruction, students indicated their learning preferences were fulfilled regarding all four dimensions of the whole learner: cognitive, sensorimotor, social and emotional. In contrast, the findings show that students who did not experienced MuFHA based science instruction, did not indicate their learning preferences were fulfilled. It was also found that teachers who implemented instructional methods of the MuFHA in their classrooms (intervention group), felt their own needs were better addressed and they managed to better meet the needs of their students in the four dimensions, compared with the teachers who did not apply this approach in their classrooms (comparison group).

The findings highlighted the need for diverse instructional methods, the need to teach the skills of group work as integral parts of instruction, and the need for focused guidance for teachers to help them apply in classroom the tools they acquired at the professional development course.

In addition, looking at the findings of this study, the emotional dimension stood out. Teachers and students are measured by grades and the learning outcomes dictated from above, whereas according to this study, both students and teachers ask at every possible opportunity to consider their emotional skills. Students ask for an egalitarian and inclusive dialogue, long before they are labeled as "advanced," "moderate," or "slow," learners and teachers seek to be valued for their educational skills and the interpersonal relationships they create with students. The fact that in this study the emotional aspect was very prominent show us that the educational system, which currently emphasize the cognitive dimension, should also emphasize the importance of supporting the emotional dimension of the whole learner.

In accordance with the literature, our findings in this study show the diversity that do exists in the inclusive science classroom. The application of the MuFHA in science instruction is feasible and may address the individual needs of each student, relating to the four dimensions of the

whole learner: cognitive, social, emotional, and sensorimotor. The MuFHA adopts an equality approach towards the students and enhance a sense of belonging. As a result, as the findings show, students who experienced MuFHA based instruction, felt that their needs were understood and addressed. The teachers who taught by implementing the MuFHA felt that they were meeting their students' needs as well as their own needs. Thus, this study contributes to the practical aspect of teaching in the science classrooms and to the ethical social aspect of science instruction by providing learning opportunities to every student according his/her needs and learning preferences.