



מכון ויצמן למדע
WEIZMANN INSTITUTE OF SCIENCE

M.Sc. Research Abstract

תקציר מחקר לתואר שני

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מאת:
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The implementation of a personalized online learning system in chemistry (Chem-PeTeL), and the influence of it on student's misconceptions and attitude in and towards chemistry and towards learning in the online environment.

עמדות תפיסות של תלמידי כימיה לגבי למידת כימיה באמצעות מערכת פט"ל, בהקשר של אמונה במסוגלות עצמית וגישה כלפי הדיסציפלינה וכלפי למידה בסביבה טכנולוגית.

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Abstract

Train up a child in by his own way, for even when he is old, he will not waiver from it.

Proverbs 22,6

The shift in focus of learning from teachers to students goes back to John Dewy, Lev Vygotsky and Jean Piaget. Modern advancement in technology has allowed for the manifestation of students-centered learning in the classroom, bringing about personalized learning through computerized and online systems. One prominent example is the PeTeL system (Personalized Teaching and Learning), developed by the Science Teaching department at the Weizmann Institute of Science. The PeTeL system is a joint effort by the department's different groups, to bring the personalization of learning to science classes in Israel. This work followed the first implementation of the Chem-PeTeL system – the system's branch dedicated to chemistry learning – in chemistry classrooms across the country. The research was conducted as a mix method approach, combining information from questionnaires along with case studies comprised of partially-structured questionnaires and interviews. The research focused on the ramifications of learning chemistry with the system, on students' concept understanding, as well as on attitude and self-efficacy beliefs – regarding chemistry as a subject matter, learning with computerized systems and learning chemistry in such a system. The research was conducted on a test group of 100 high school chemistry students, from central and northern Israel, during the 2019-2020 academic year.

The study showed a decline in all of the four categories examined through attitude and self-efficacy questionnaires (though only on two it can be considered significant), but those results can be partially attributed to the Covid-19 pandemic that hit the world through the second half of the timeframe for the study. Four case studies were compiled based on questionnaires and interviews with 2 teachers, which demonstrated Chem-PeTeL's capabilities for personalization of teaching and potential for differential instruction. This work served as a basis for my Ph.D research.