# MEASURING COMPLEX PROBLEM-SOLVING IN JORDANIAN HIGHER EDUCATION: THE EFFECTS OF DEMOGRAPHIC, COGNITIVE AND AFFECTIVE FACTORS ON STUDENTS' ACHIEVEMENT

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Nowadays, institutes need to prepare students for jobs and technologies that do not yet exist, and to solve problems that they have never tackled before (OECD, 2018) to succeed in this new world. Those prospects have created new needs in higher education, and led to a growing interest in assessment instruments that cover a wider area of competencies than traditional domain-specific skills and disciplinary knowledge (Molnár & Csapó, 2018). These assessments can be used to measure students' 21st century skills. Complex problem-solving (CPS) is such a construct, and enables us to study problem-solving skills in uncertain situations (Funke, 2001). The aim of this study was to ascertain the effects of demographic, cognitive, and affective factors on students' CPS achievement in Jordanian higher education. More particularly, we examined the effects of gender, working memory (WM), and test-taking motivation (TTM) on students' CPS achievement. The participants were Jordanian university students (age: 18–22, male 41.6%, N=457). CPS was measured with the MicroDYN approach (Greiff & Funke, 2017) through 10 independent problems with different complexity levels (alpha=.87). The WM test contained 16 items with varying levels of difficulty (alpha=.88). The test-taking motivation questionnaire contained 10 Likert-scale items (alpha=.92). The tests and the questionnaire were administered via the eDia platform (Molnár & Csapó, 2019). We ran path analyses in MPlus to analyze the predictive power of the demographic, cognitive, and affective factors being assessed on students' CPS achievement. All four path models fitted the data well (CFI: 1.000 TLI: 1.000; RMSEA: .000). In the first model, we regressed WM on CPS, which explained one fifth of the variance in CPS (Rsquare=.205). WM significantly predicted CPS performance (beta=.347). In the second model, students' test-taking motivation was regressed on CPS. The explained variance was Rsquare=.128 and beta=.358, indicating a significant prediction effect. In the third model, gender was regressed on CPS. Both the explained variance and the path coefficients dropped immensely (Rsquare=.033, beta=-.182). Finally, in the fourth path model, we integrated all the factors under investigation. Gender, working memory, and test-taking motivation explained 27% of the variance of CPS, and, consistent with earlier results, students' level of working memory proved to be the most influential factor (beta=.341), which was followed by their level of test-taking motivation (beta=.242); with the weakest but still significant influential factor being gender (beta=.147). That is, all the factors under investigation had predictive power on students' problem-solving skills. Male students with better working memory and higher test-taking motivation tended to achieve the highest on the CPS test. The results of the current study contribute to an understanding of how demographic, cognitive, and affective factors predict students CPS achievement.

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