Psychological challenges in programming e-learning

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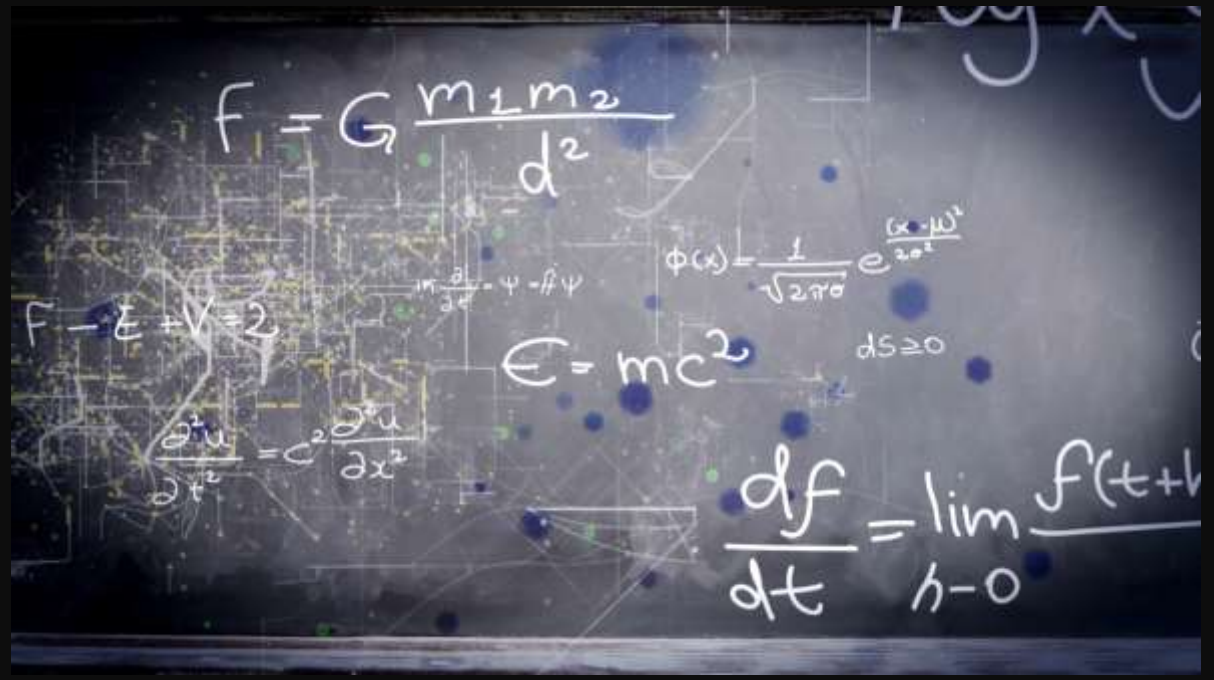


Problem

- Learning computer programming remains highly challenging for many individuals (Chorfi et al., 2022), with dropout rates in programming courses being among the highest compared to other disciplines (Takács et al., 2022).
- Research indicates that online courses have significantly higher dropout rates than traditional courses (Muljana & Luo, 2019; Delnoij et al., 2020), as e-learners encounter various challenges, including motivation, time management, and self-monitoring (Lee et al., 2021).

Problem

Previous studies have identified several challenging factors:

- learning motivation (Law et al., 2019; Chi, Zhang, & Shi, 2023),
- academic achievements (Emily, 2023),
- interest in the subject (Geisler, Rolka, & Rach, 2023),
- learner characteristics (Boyacı, 2019),
- course design, learning context (Aldowah et al., 2020),
- lack of collaborative work (Wang et al., 2019; Greenland & Moore, 2022).

However, the comprehensive set of variables associated with dropout in computer programming e-learning is still relatively unexplored.

Purpose of the study

This study aimed to investigate the impact of:

- initial grades (achievements),
- personality traits,
- learning motivation,
- satisfaction/frustration of basic psychological needs

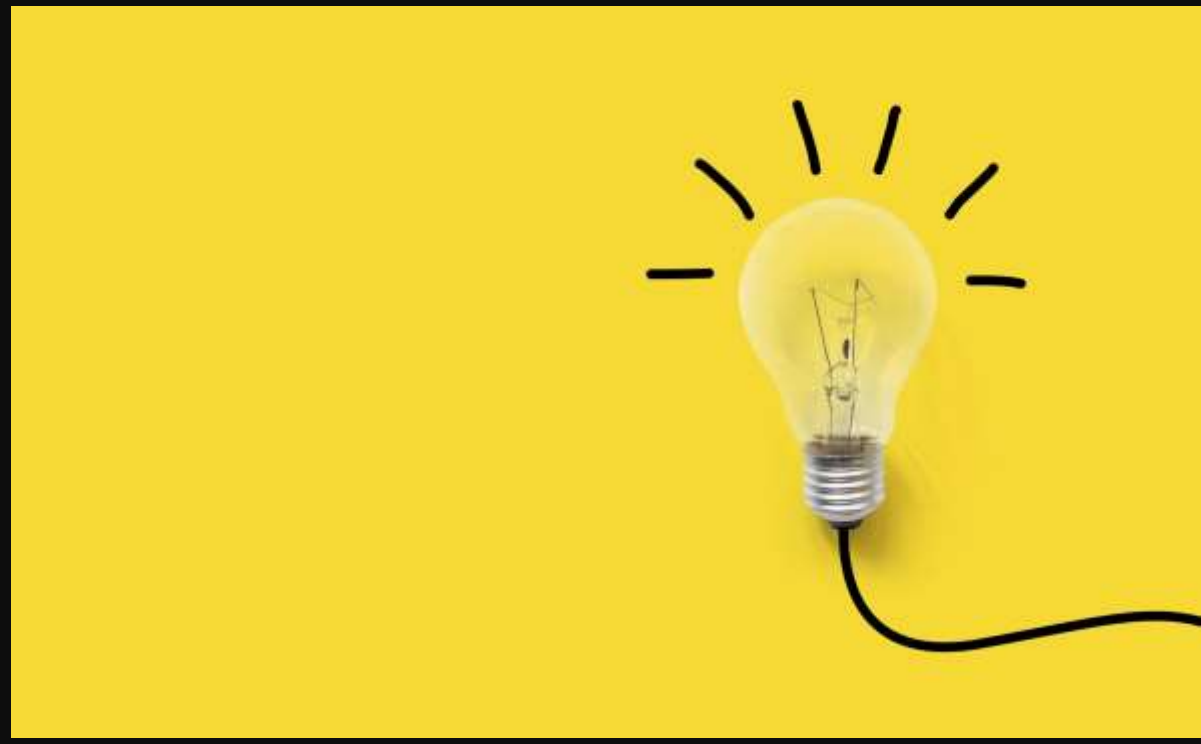
on dropout rates in computer programming e-learning courses.

Participants

- A quasi-experimental design was employed to examine the role of different factors in dropout within e-based computer programming courses.
- A total of 313 students participated in this quasi-experiment, and after data cleaning, the final sample consisted of 305 participants.
- The participants had an average age of 29.96 years (SD 8.27), ranging from 18 to 54, and all were Lithuanian citizens.

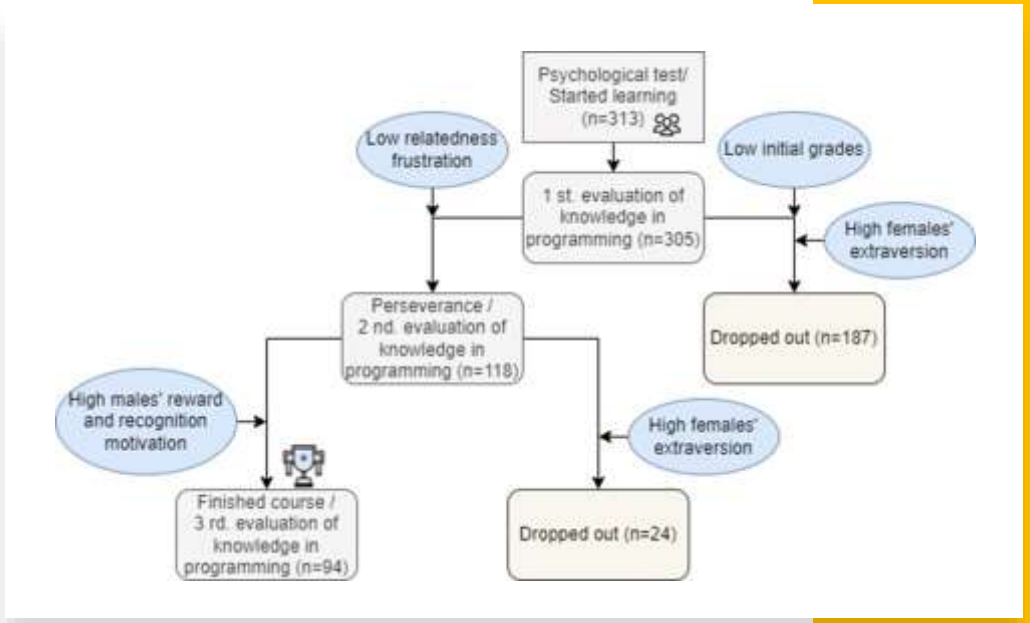
Instruments

- To assess learning motivation, the Learning Motivating Factors Questionnaire (LMFQ; Law et al., 2009, 2010) was utilized. This questionnaire consists of 20 items that cover various motivational variables positively influencing learning.
- Personality traits were evaluated using the Big Five-2 (BFI-2; Soto & John, 2017), a questionnaire comprising 60 items that assess extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience.
- To assess satisfaction or frustration of psychological needs, The Basic Psychological Need Satisfaction & Frustration Scale (BPNSFS; Chen et al., 2015), which consists of 24 items and assesses satisfaction/frustration of needs for autonomy, competence, and relatedness, was applied.



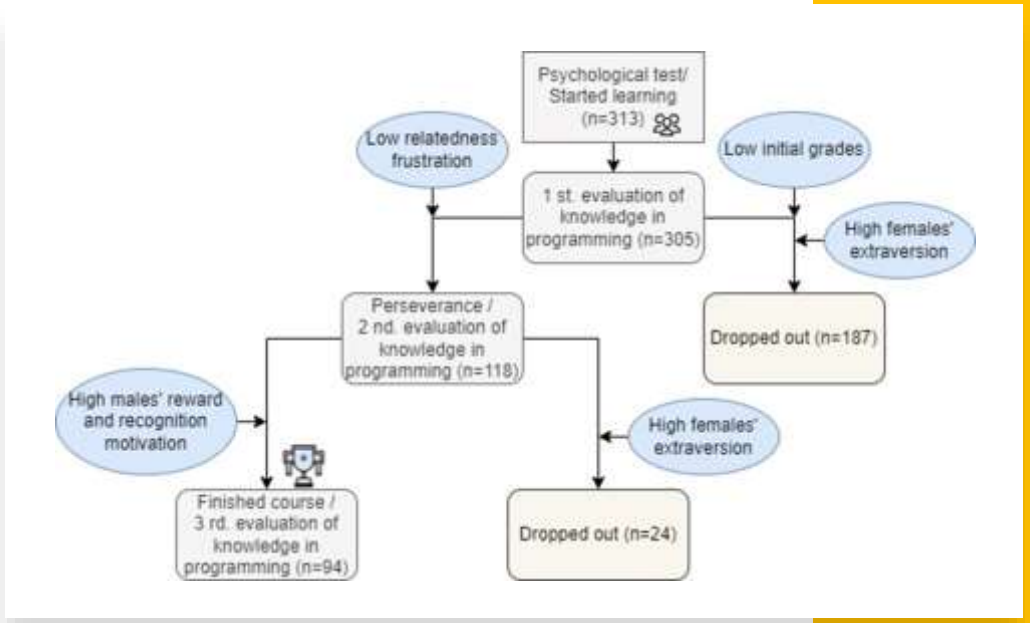
Findings

- 1) Low initial knowledge assessment scores in computer programming e-learning significantly contribute to dropout. Participants who completed the e-learning courses demonstrated higher initial knowledge assessment scores compared to those who quickly dropped out after the first assessment.



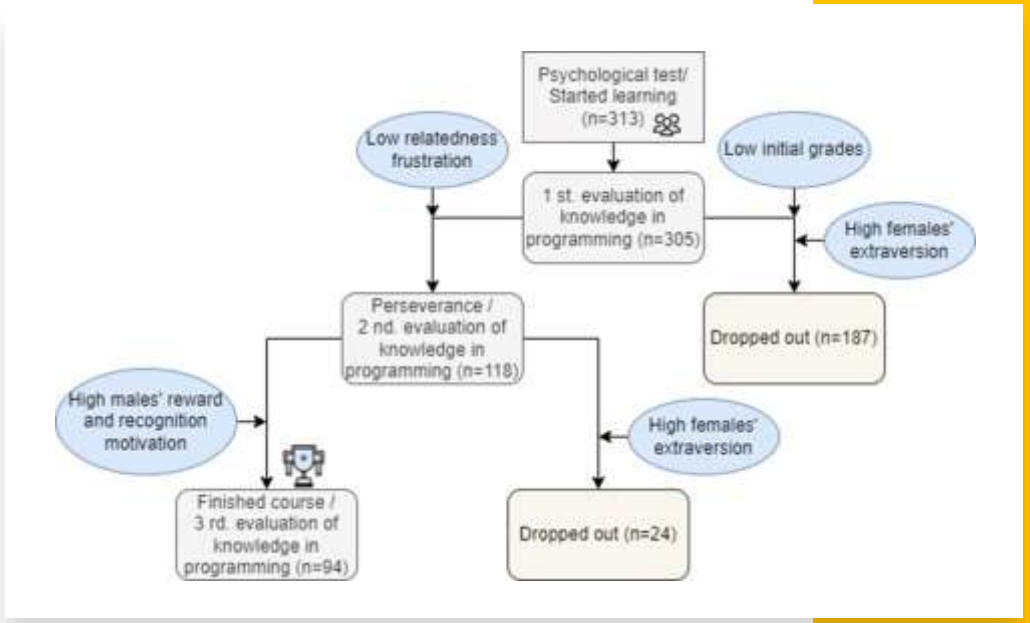
Findings

- 2) Reward and recognition as motivators play significant roles in the dropout of computer programming e-learners. Participants who completed the course exhibited significantly higher levels of reward and recognition as motivators compared to those who dropped out after the second knowledge assessment. Reward and recognition were statistically significant in predicting the odds of dropout among males but not among females or the entire sample.



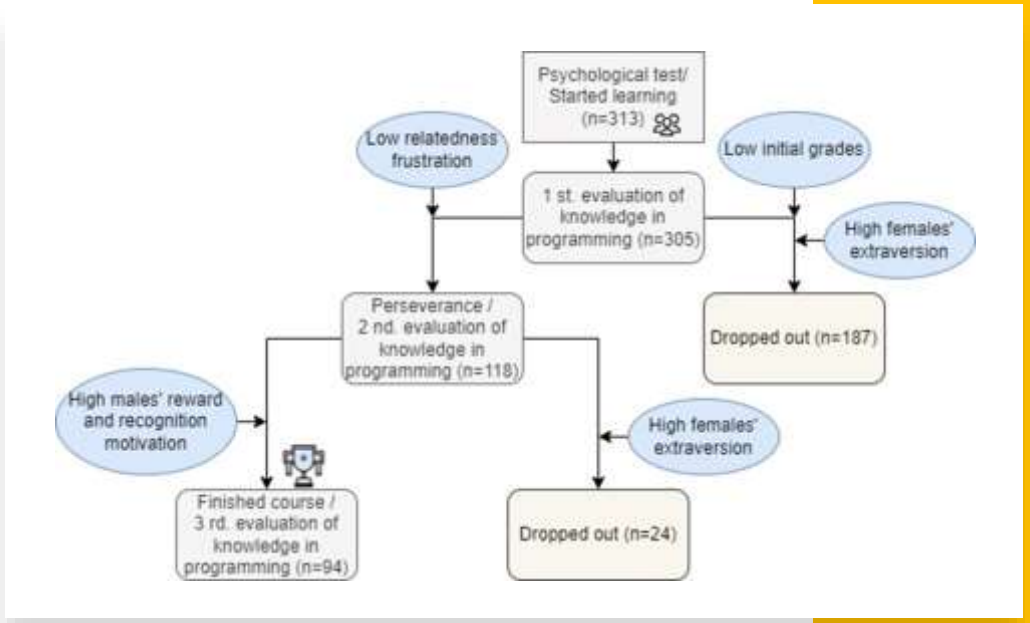
Findings

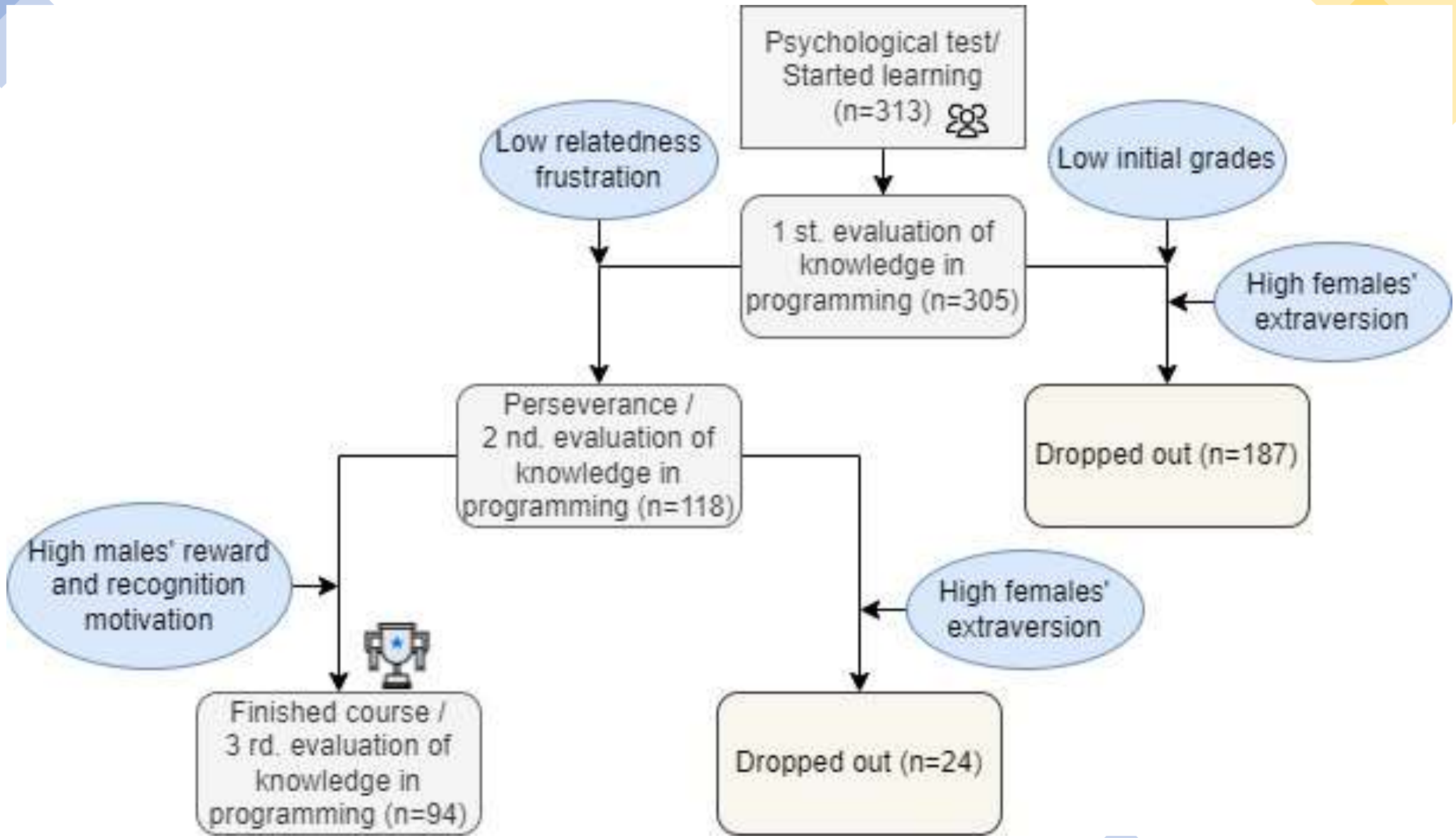
- 3) Personality traits of computer programming e-learners play a significant role in dropout. Among females, extraversion was found to be statistically significant in predicting the odds of dropout. Extraversion was significantly lower in females who completed the course compared to those who dropped after the second knowledge assessment or after the first knowledge assessment test. Withdrawers were almost three times more likely to have higher extroversion than non-withdrawers.



Findings

- 4) Satisfaction/frustration of basic psychological needs of computer programming e-learners plays a significant role in dropout. Relatedness frustration plays a significant role in the dropout of computer programming e-learning: relatedness frustration was significantly higher among those who dropped out of the course after the first knowledge assessment than those who withdrew after the second knowledge assessment. However, the impact of satisfaction/frustration of basic psychological needs separately in groups of females and males on completing the computer programming e-learning course is still ambiguous.




Psychological test/
Started learning
(n=313)
Low relatedness
frustration
Low initial grades
1 st. evaluation of
knowledge in
programming (n=305)
High females'
extraversion
Perseverance /
2 nd. evaluation of
knowledge in
programming (n=118)
Dropped out (n=187)
High males' reward
and recognition
motivation
High females'
extraversion
Finished course /
3 rd. evaluation of
knowledge in
programming (n=94)
Dropped out (n=24)

Thank you!

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