

Development of an educational package based on the cognitive components of critical thinking, problem-solving and metacognition and its effect on students' resilience

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Abstract

Introduction: Resilience as a motivational-emotional variable has a vital role in dealing with stress and anxiety problems in school and university. As one of the educational packages affecting academic variables, the metacognitive package consists of three components: critical thinking, problem-solving, and metacognition. The current study aimed to develop an educational package on the cognitive components of critical thinking, problem-solving, and metacognition and their effect on students' resilience.

Methods: The present study was quasi-experimental with a pretest-posttest design with a control group. The statistical population included all first-grade female students of the second secondary school in Zanjan in the academic year 2019-2020, of which 40 students were randomly selected by multi-stage cluster sampling method who were assigned into the experimental and control group (20 people in each group). The research instrument included a 25-item resilience scale (CD-RIS). The psychological package of critical thinking, problem-solving, and metacognition was considered for the experimental group students in 17 sessions of 90 minutes in two sessions per week, but it was not considered for the educational control group. Data were analyzed using the analysis of covariance in SPSS-24 software.

Results: The results revealed that the educational package of cognitive components of critical thinking, problem-solving and metacognition affects students' academic resilience ($P < 0.05$). In other words, the rate of academic resilience in people who participated in cognitive components training sessions increased significantly compared to the control group.

Conclusion: According to the results of this study, it is possible to suggest an educational package of cognitive components as a facilitator in learning and an influential factor in increasing student resilience so that in practice in counseling centers and workshop treatment centers. Courses cognitive components should be considered for school counselors and parents.

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Extended Abstract

Introduction

Resilience as a motivational-emotional variable has an essential role in dealing with stress and anxiety problems in school and university. Resilience is often considered a trait related to character, personality, and ability to cope.

Resilience refers to empowerment, flexibility, the ability to master or return to normalcy after facing stress and severe challenge. One of the effective personal characteristics in resilience is the ability to create self-regulation

or self-control. In general, personality traits such as positive self-concept, socialization, intelligence, adequacy in educational work, autonomy, self-esteem, good communication, problem-solving skills, and mental and physical health are practical factors in increasing resilience in the individual. In the field of education, resilience plays an crucial role as a motivational-emotional variable and is a suitable mechanism for dealing with stress and anxiety problems in the school and university environment. One must be able to understand one's ability better and respond effectively to situations and adjust one's motivation. As a result, resilience can be considered a meta-motivational variable. Therefore, different dimensions of students' educational status, including their resilience, should be examined to get more accurate information on the current situation, interests, desires, and abilities. He acquired his weaknesses and prepared him by teaching his educational strategies and attitudes for class activities, as well as daily life. The present study aimed to develop an educational package based on the cognitive components of critical thinking, problem-solving, and metacognition to evaluate their effectiveness. It was the students' academic achievement.

Methods

The present study was quasi-experimental with a pre-test-posttest design with a control group. The statistical population included all first-grade female students of the second secondary school in Zanjan in the academic year 2019-2020, of which 40 students were selected by multi-stage cluster sampling method and randomly in the experimental and control group (20 people in each group) were assigned. Inclusion criteria included first-grade high school female students, low resilience score, commitment to attend all treatment sessions, and failure to receive individual counseling and psychological services during attendance at treatment sessions. Exclusion crite-

ria included having a specific physical or mental illness, absence from treatment sessions, and unwillingness to continue participating in the study. The research instruments included the 25-item Connor-Davidson Resilience Scale (2003) (CD-RIS) and the psychological package of critical thinking, problem-solving, and metacognition. In this research, designing and compiling a training package for critical thinking, problem-solving, and metacognition skills and data collection method was done in the following five steps. **The first step** to build this training package is various theories, resources, and research in the field of thinking skills. Critical, problem solving and metacognition were studied and articles related to critical thinking, problem solving and metacognition skills were reviewed. **In the second stage**, according to the results of previous research on critical thinking, problem-solving, and metacognition skills, the component **In the third stage**, to design and develop a training package for critical thinking, problem-solving, and metacognition skills, review and study the training programs that were used in previous research to strengthen critical thinking, problem-solving, and metacognition skills. In addition to the above activities, in designing and compiling the educational package, students' age and cognitive status and the opinions and suggestions of experts in this field have been taken into account. **The fourth stage** was to review the content validity of the educational package by experts in this field. For this purpose, the training package was reviewed by several experts in this field, and its problems were fixed, and their suggestions were implemented. **The fifth stage** was the preliminary implementation of the training package. The purpose of this stage was to modify the educational package and adapt it to the characteristics of the students and be aware of unforeseen problems. For this purpose, the educational package was implemented on ten students, and its problems and shortcomings were eliminated. After fixing the problems, the final form was

prepared and prepared for implementation for the training sessions. The final form of the training package was developed during 17 90-minute sessions in two sessions per week for the experimental group students, but for the control group, training is not considered. Data were analyzed using the analysis of covariance in SPSS-24 software.

Results

The results showed that the educational package of cognitive components of critical thinking, problem-solving and metacognition affects students' academic resilience ($P < 0.05$). In other words, the rate of academic resilience in people who participated in cognitive components training sessions increased significantly compared to the control group.

Conclusion

Teaching how to use metacognitive knowledge makes students perform better in lessons. The learners have a variety of knowledge and information that they read and combine while learning to provide a functional or educational environment. The knowledge that learners use is awareness of being a learner, awareness of the tasks they have to do, and a treasure of learning skills and strategies. Critical thinking training allows students to choose rational solutions and decisions with a positive and accurate assessment of the existing situation, rather than emotionally. This occurs quickly and without using their cognitive abilities. In other words, critical thinking causes people to be actively involved in educational issues and test all possible ways to deal with educational obstacles and problems, and rather than dealing with issues in a specific and standard way. This is a comprehensive approach and Have insight and make creative decisions by examining issues from different angles.

On the other hand, problem-solving skills enable students to experience quick successes, feel better about them-

selves, and motivate them to change. In fact, increasing the problem-solving ability can act as a protective umbrella for the person and make the person resilient. People with high problem-solving ability struggle with challenges and can usually solve them successfully. According to the results of this study and the effect of the educational package of cognitive components on students' academic resilience, it is suggested. Provide curricula tailored to students' cognitive and metacognitive requirements, provide them with the opportunity to be absorbed in the curriculum, and focus on homework with their natural tendencies. Students are also emphasized on creativity rather than competition, and students learn to look less at external rewards and increase their academic motivation with internal rewards and reinforcements. Also, according to the results of this study, it is possible to suggest an educational package of cognitive components as a facilitator in learning and an influential factor in increasing student resilience so that it can be practiced in counseling centers and workshop treatment centers. Cognitive components for school counselors and parents should be considered.

Ethical Considerations

Compliance with ethical guidelines

Among the ethical principles observed were not violating the rights of individuals participating in the research, respecting human rights, and keeping the results of their research confidential. Before the intervention, the participants were explained of the study's objectives and informed consent was obtained from them. Also, after completing the training sessions on the training groups and performing the posttest, the treatment sessions were intensively performed on the control group to observe the ethical principles.

Authors' contributions

The Khalil Hoseinkhani and Masoud Ghasemi proceeded

to select and define the concepts of the action plan and, in collaboration with the Masoud Hejazi, prepared the initial manuscript. All authors performed a search of the research literature and research background. Khalil Hoseinkhani and Masoud Ghasemi also designed and performed the experiments and collected and analyzed the data. All authors provided critical feedback and contributed to the formation of the research, analysis, and manuscript. All authors discussed the results and participated in compiling and editing the final version of the article.

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Conflict of interest

This study did not have any conflict of interest.