

# Developing Problem Solvers: An Activity-Based Intervention Approach for Adolescents

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**Abstract:** *Problem-solving ability is a critical cognitive skill that significantly influences academic success and everyday decision-making in adolescents. Enhancing this skill during adolescence can lead to better outcomes in both personal and professional aspects of life. This study investigates the impact of targeted mental workouts on the problem-solving abilities of adolescents. Utilizing a pre-post experimental control group design, 240 adolescents were randomly assigned to either an experimental group, which received the mental workout intervention, or a control group, which did not. The intervention consisted of structured activities designed to enhance cognitive functions related to problem-solving. Pre-intervention assessments established a baseline of problem-solving abilities for both groups. Following the intervention period, post-intervention assessments revealed that the experimental group demonstrated significant improvements in problem-solving skills compared to the control group. These findings underscore the effectiveness of targeted mental exercises in enhancing cognitive capabilities in adolescents, suggesting potential applications for educational and developmental programs.*

**Keywords:** Problem solving, mental workout, adolescents

## 1. Introduction

Problem-solving skills are foundational cognitive abilities that significantly shape the performance and achievements of adolescents. During adolescence, individuals face a myriad of complex challenges, both academic and personal, that require effective problem-solving strategies. These skills are not only pivotal for academic success but also for navigating social relationships and making informed decisions in everyday life. The ability to analyze situations, identify potential solutions, and implement effective strategies empowers adolescents to overcome obstacles and achieve their goals. This research paper aims to delve into the crucial role problem-solving skills play in shaping the performance and achievements of adolescents. By examining the impact of targeted mental workouts on the problem-solving abilities of adolescents, we seek to uncover the untapped potential that lies within their minds. Ultimately, we aim to demonstrate how honing problem-solving skills can unlock the competitive edge necessary for success, equipping adolescents with the tools they need to thrive in a rapidly evolving world.

Life poses numerous challenges, often termed "problems." In psychology, a "problem" denotes an externally defined task, like a maze or puzzle, with a clear solution [1]. Problem-solving forms the framework for creative thinking, fueled by tension from unmet desires, driving observation, prediction, and inference to overcome barriers [1]. Effective problem-solving yields knowledge acquisition and concept assimilation.

The necessary evolution in 21st-century education involves transitioning from rote memorization to fostering problem-solving skills applicable in various life contexts. Jahoda [2], [3] proposed that the ability to solve problems in real-life situations is a criterion for defining positive mental health. Research indicates that general self-efficacy, reflecting overall confidence in one's ability to cope with a wide range of demanding, unexpected, and novel situations, is closely

linked to general problem-solving ability. This self-efficacy is a key predictor of positive adjustment during adolescence and successful outcomes across different life domains, even under adverse conditions [4], [5].

In today's demanding world, mental well-being significantly impacts performance. Amidst competition and uncertainties, nurturing mental health is crucial. This research explores enhancing problem-solving for adolescents' mental well-being. Problem-solving empowers adolescents to navigate challenges, reducing stress and anxiety. Improved problem-solving equips adolescents to address mental health concerns. This study emphasizes integrating mental health support and problem-solving training for a holistic adolescence community.

Exercise's role in physical health is well-established, and similarly, mental exercises are vital for mental health. Cognitive exercises enhance brain function and abilities, promoting neuroplasticity. Regular mental exercises, like puzzles and memory games, improve cognitive function. Mindfulness practices reduce stress, fostering mental well-being. This research highlights incorporating mental exercises into daily routines alongside physical activities for holistic well-being.

In order to augment the problem-solving aptitude of participants in the experimental group, two distinct activities were implemented. The initial task entailed presenting a box and instructing participants to envision the scenario wherein someone had gifted them a pet concealed within. Subsequently, they were tasked with detailing all the pertinent information and queries regarding this hypothetical pet, which they inscribed within the provided worksheets. For the subsequent activity, participants were directed to outline the favorable aspects of online classes within the provided worksheets. This comprehensive approach aimed to cultivate their problem-solving skills through targeted engagement and introspection.

## 2. Hypothesis

Activities would significantly enhance problem solving ability in the experimental group.

## 3. Methodology

### 3.1 Sample

Utilizing incidental sampling, the research gathered empirical data from a sample comprising 240 individuals aged 16 to 18 years, sourced from various educational institutions in Patiala and Sangrur. Ethical clearance was secured from both the school principals and participants prior to the commencement of the study. Among the sampled subjects, 150 were allocated to the experimental group, while the remaining 90 were assigned to the control group via the fishbowl draw method.

### 3.2 Procedure

The current study employed a pre-post experimental control group design encompassing three distinct phases:

Initially, during the first phase, pre-intervention scores were procured from both the experimental and control groups using The Problem Solving Inventory [6].

Subsequently, in the second phase, participants within the experimental group engaged in two targeted activities facilitated through an online platform, with the intention of enhancing their problem-solving inventory.

Finally, the third phase encompassed the acquisition of post-intervention scores from both experimental and control groups, achieved by administering the aforementioned questionnaire once again through an online medium.

### 3.3 Description of Test

**The Problem Solving Inventory [6]:** The Problem Solving Inventory measures an individual's perceptions regarding one's problem solving abilities and problem solving style in everyday life. Comprising 32 items, respondents are tasked with evaluating these items on a six-point Likert scale. The inventory demonstrates robust internal consistency, exhibiting reliability levels ranging from .79 to .99 [7].

## 4. Results and Discussion

To analyze the impact of independent variable on the dependent variables, one-way repeated measures ANOVA was applied.

**Table 1:** Comparison of the control and experimental group on post-intervention scores for problem solving ability

| Variables               | Intervention         |       |                            |       | F-ratio | p value |
|-------------------------|----------------------|-------|----------------------------|-------|---------|---------|
|                         | Control Group (n=90) |       | Experimental Group (n=150) |       |         |         |
|                         | Means                | SD    | Means                      | SD    |         |         |
| Problem Solving Ability | 93.37                | 13.55 | 102.05                     | 11.54 | 27.89** | .000    |

\*\*p<0.01

The findings notably illustrate that participants within the experimental group exhibited elevated problem-solving abilities ( $M = 102.05$ ) in contrast to their counterparts in the control group ( $M = 93.37$ ). The intervention's impact on problem-solving ability emerged as statistically significant, denoted by a notable distinction between the experimental and control groups [ $F(1, 238) = 27.89, p < 0.01$ ].

## 5. Discussion

In the 1940s, Pólya [8] introduced "mental operations useful for problem-solving," now termed problem-solving strategies. Problem-solving, a cognitive skill, develops from childhood to adulthood [9], [10]. Effective problem-solving influences independence, cooperation, academics, and overall quality of life [11], [12], [13].

Interventions aimed at improving problem solving ability focus on two primary goals: (1) transforming negative "problem orientation" to cultivate a more hopeful approach to challenges, and (2) improving "problem-solving style" by teaching skills for effectively defining and resolving issues [14]. This process typically involves structured steps such as identifying the problem, evaluating potential solutions, and implementing them in real-life situations.

Maier's [15], [16] research shows subsequent attempts with effective information yield superior solutions.

Valdez et al. [17] showed problem-based learning effectively enhances students' problem-solving. Findings align with Dochy et al. [18], observing lasting skills among students exposed to problem-based learning. White [19] noted it enhances skills and conceptual understanding. Evidence shows it fosters reasoning, problem-solving, and self-directed learning [20].

Effective interventions for problem-solving orientation and style yield substantial life benefits. Valdez et al.'s [17] study underscores its positive impact, highlighting its lasting effects. Research emphasizes problem-solving's role in personal growth, suggesting holistic improvement through targeted interventions.

## 6. Conclusion

In conclusion, the parallels between physical and mental well-being have become increasingly apparent, highlighting the essential role of exercise and mental exercises/activities in promoting holistic health. Just as physical exercise is crucial for maintaining physical health, engaging in cognitive exercises and mental activities is equally vital for nurturing mental well-being. The findings of this study demonstrate the remarkable potential of targeted interventions involving specific mental activities to enhance problem-solving abilities. The experimental group, exposed to a structured intervention encompassing two distinct mental activities, exhibited a significant improvement in problem-solving skills. This underscores the transformative impact that intentional mental exercises can have on cognitive functions, mirroring the benefits of physical exercise on physical health. As individuals embark on the journey toward optimal well-being, it is imperative to recognize the synergistic relationship

between physical and mental exercises, emphasizing their interdependence in fostering a balanced and thriving life. Through continued research and integration of such interventions, we pave the way for a comprehensive approach to health that encompasses both the body and the mind, ultimately leading to improved problem-solving abilities and overall quality of life.

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