

Influences Affecting The Development of Critical Thinkers in Students

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Abstract

Participation in extracurricular activities, formal classroom and instructional encounters, and exposure to the curriculum are the three aspects of students' collegiate experiences that will be investigated in this study in an effort to determine the distinct impacts that each of these aspects has on improvements in critical thinking. The experiences that students have outside of the classroom as well as those that they have within the educational setting have a discernible, statistically significant, and beneficial impact on the development of critical thinking abilities in students. This is in addition to the pre-college characteristics and aptitude for critical thinking that students bring with them to college. This study presents empirical data to support a notion that has been around for a long time, namely that the academic and non-academic experiences of students combine synergistically to influence one another and one's personal growth and development. It is possible that anyone working in the field of evaluation or college research impact analysis will find the design and methodology used in this study to be of significant use.

Introduction

Based on an extensive range of research, it has been observed that a considerable proportion of the factual knowledge acquired during college education may not be retained over an extended period following graduation (McLeish, 1968; Gustav, 1969; Mixt & Blizzard, 1975; Brethower, 1977). The issue of eventual obsolescence of preserved content is a serious concern in various professional and occupational domains. Consequently, assertions on the advantageous impacts of higher education on student learning necessitate empirical evidence that substantiates the ways in which these institutions facilitate the cultivation of enduring cognitive abilities. The possession of critical thinking skills is often regarded as a crucial attribute that individuals ought to possess, since it plays a pivotal role in the process of continuous learning throughout one's lifetime.

It would be prudent for higher education institutions to promote, if not require, their students to develop these skills. Pascarella and Terenzini (1991) assert that there

exists a multitude of interpretations and assessments pertaining to the concept of "critical thinking." Broadly speaking, cognitive flexibility encompasses the capacity to engage in various cognitive activities, including recognizing central points of disagreement and underlying assumptions within a discourse, identifying important connections, deriving dependable inferences from information or data, appraising the trustworthiness of conclusions drawn from the provided data, and evaluating corroborating evidence or credible sources.

The criteria and metrics employed for assessing critical thinking skills exhibit variability in accordance with the prevailing scholarly literature. The findings, however, consistently provide evidence for a comprehensive comprehension of the factors that are impacted and those that remain untouched by enhancements in students' critical thinking skills. These skills, such as critical thinking and problem-solving, do not seem to be influenced by a student's academic specialization. Numerous scholarly investigations (e.g., Pascarella, 1989; Pascarella & Terenzii, 1991) have demonstrated that the presence of precollege differences in an individual's academic aptitude or critical thinking capacities becomes inconsequential when taken into account, leading to their elimination. Multiple scholarly investigations have examined the diversities observed among academic disciplines, as evidenced by the works of Burns (1974), Bennett (1975-76), and King, Wood, and Mines (1990).

It is important to acknowledge that there is a lack of empirical evidence supporting the claim that particular instructional elements have a substantial influence on the enhancement of critical thinking skills. The scholarly article authored by McMillan in 1987 offers a comprehensive evaluation of the research discoveries within this field, so enhancing the credibility of this claim. According to Pascarella and Terenzini (1991), the duration of a semester or quarter-long course experience may not be sufficiently extensive to yield a noticeable impact. This phenomena may provide an explanation for the absence of significant repercussions.

Although the influence of an individual course on critical thinking may be relatively limited, the cumulative effect of multiple courses taken within a specific subject area seems to be significant. Numerous empirical investigations have established a correlation between the quantity of science, music, literature, and art courses undertaken and enhancements in critical thinking abilities. Despite controlling

for initial differences in aptitude or critical thinking abilities, the association between the variables in question remains strong (Dressel & Mayhew, 193., Pike, 1989; Pike & Phillippi, 1988; Pike & Banta). Winter, McClelland, and Stewart (1981) argue that the extent of benefit derived from the completion of academic courses is contingent not just on the quantity of courses undertaken, but also on the degree of interconnectedness among these courses.

Based on the research outcomes, it was observed that students who engaged in a curriculum emphasizing the integration of concepts and coursework across multiple disciplines exhibited a more substantial enhancement in their critical thinking abilities compared to their counterparts who opted for conventional courses addressing similar subject matter but lacking an integrative approach. The aforementioned benefits were significantly more pronounced among students who engaged in a program that necessitated the integration of concepts and assignments from other disciplines. Forrest (1982) presents empirical findings that are analogous to the aforementioned illustrative instance. According to Ratcliff and Jones (1992, p. 42), their research findings indicated that the augmentation of analytical thinking abilities was associated with certain combinations and sequencing of courses across several topic domains, as opposed to a singular comprehensive curriculum.

There exist discernible variations among the various facets that contribute to further pedagogy. Smith's (1977, 1981) research indicates that there is a positive correlation between gains in critical thinking abilities at both the individual and class levels and three distinct forms of instructor-influenced classroom interactions. This assertion has validity despite the absence of regulations that limited the use of critical thinking prior to the collegiate level during Smith's investigation in 1977 and 1981. The degree to which educators motivate, appreciate, and incorporate their students' ideas; the quantity and caliber of students who engage actively in classroom discussions; and the duration of their interactions with their peers.

An increasing corpus of empirical research indicates that a student's engagement in extracurricular and academic pursuits exerts a substantial influence on the maturation of their critical thinking capacities and other cognitive aptitudes. Gaff, Wilson, and their colleagues (Gaff, 1973; Wilson, Wood, and Gaff, 1974; Wilson, Gaff, Dienst, Wood, and Bavry, 1975) have established a correlation between student

engagement in diverse activities and different forms of cognitive development. According to Anaya (1989) and multiple studies conducted at the State University of New York at Albany (e.g., Terenzini, Theophilides, & Lorang, 1984; Volkwein, Wright, & Agrotos, 1987; Terenzini & Wright 1987), extracurricular activities have an impact on various aspects of higher-order cognitive functioning. The initial presentation of this evidence was made by Anaya in 1989.

Pascarella's (1989) work provides the most precise and comprehensive information regarding the development of critical thinking skills that is now accessible. Even when considering pre-college levels, there was no significant correlation found between improvements in critical thinking skills and personal characteristics such as residing on campus, interacting with professors and peers, and dedicating time to studying. Among the experiences reported were interactions with teachers and classmates. On the contrary, there was a strong correlation observed between enhancements in critical thinking skills and indicators of both social engagement and academic involvement. This suggests that the benefits of college attendance may not be limited to a singular type of experience, but rather might accumulate and interact with one another.

An increasing corpus of scholarly literature indicates a correlation between improvements in overall cognitive abilities and the kind of interactions between students and teachers, with a particular emphasis on those interactions that take place beyond the confines of the classroom. This assertion holds particular validity in the context of discussions conducted beyond the confines of the traditional educational setting. Numerous academics have presented empirical evidence on the functions fulfilled by these significant socialization agents. Ory and Braskamp (1988), Pace (1987, 1990), Terenzini and Wright (1987), Pascarella and Terenzini (1978), Terenzini and Pascarella (1980), Endo and Harpel (1982, 1983), and Baxter Magolda (1987) are scholars who have conducted study in this field.

Methods

A fundamental component that acts as the basis or framework for a certain entity or system is referred to as the foundational structure of that entity or system. This study makes use of a fundamental conceptual framework that is longitudinal in character, as shown in Figure 1. This framework was developed with the assistance of a number of

scholarly sources, including Astin (1984), Pascarella (1985), Tinto (1975, 1987), and Weidman (1989), among others. The suggested model postulates six unique sets of constructs, each of which outlines a different step in a chain of causal events, beginning with the fact that students come to college possessing a wide variety of relevant characteristics from their past experiences. In addition to having an effect on the students' course selection, formal classroom experiences, and engagement in extracurricular activities throughout their time in college, these precollege characteristics have a direct bearing on the outcomes of their college careers. Individually and collectively, each of these elements has an impact on educational achievements.

The aforementioned learning components are shown to interact with one another within a particular institutional framework that includes the characteristics, structures, and rules of the organization. This study intends to evaluate the relative impact of students' curriculum, classroom, and extracurricular experiences on learning-related attitudes and values, while also taking into consideration some precollege features, such as their initial levels of excitement in studying. Specifically, this research will focus on the attitudes and values that students have toward learning. Due to the fact that this investigation is focused on a particular educational establishment, it is essential to point out that the institutional setting does not have any bearing on the observed differences in the manner in which students acquire the ability to engage in critical thinking. This is because the context is the same for all students.

The procedures of design, exemplification, and data collecting are considered to be the three most important aspects of this investigation. The research employed a longitudinal panel design that was carried out over the course of a year's time. In the context of higher education, a preliminary research was carried out in order to collect data for a more extensive, longitudinal, nationwide study on the factors that influence learning, cognitive growth, and attitudes towards learning. The purpose of the study is to better understand the factors that influence learning, cognitive development, and attitudes towards learning.

Over 4,500 undergraduate students who were enrolled in a minimum of six academic credits during their first semester (fall 1991) at a Research I institution

located in the Midwest served as the sample for this study. The institution in question was Ohio State University. This urban university mostly catered to students who lived outside of the city and commuted there. Mailings were also used to solicit applications from prospective students for participation in pre-college orientation programs. Participants in a study that was carried out on a national scale were informed that they would be financially compensated for their participation in the research activity.

In addition, the students were given the assurance that the data they submitted would be kept in strict confidence and would not be stored in the archives of their educational institution as it had been previously stated. The method of collecting data in the fall of 1991 required an approximate duration of four hours, during which participating students were compensated with a compensation of \$35. During this time period, the process took place. Students who participated in the spring follow-up survey were awarded an additional \$35 in compensation for their participation in the survey, which lasted for three and a half hours.

From a group of around 1,150 volunteers who took part in the preliminary stage of data collection before they started college, a random sample of 600 first-year students was selected to take part in the study. The limited amount of funds available for the pilot project is to blame for the relatively modest size of the initial sample. There were a total of 600 students who were chosen, and 327 of those students were successful in completing the program. This represents 54.5% of the sample population. In addition, among these students, 210 persons participated actively in the subsequent data collection that was carried out in the spring of 1992. This figure represents 64.2% of the students who successfully completed the survey.

It is important to note that the completion of this data collection signified the end of the students' first year of participation in the program. In spite of the possibility of there being some biases, the data from the survey of 210 students showed a level of representativeness that was reasonably close to that of the school's incoming freshman cohort. Although the observed trends in the children's academic aptitudes and racial composition of the sample were substantially different from those of the population from which the sample was selected, these differences did not approach the level of statistical significance to be considered significant. Specifically, as compared to students of other racial or ethnic backgrounds, the youngsters in the sample had

marginally stronger academic aptitudes and had a significantly higher probability of being white.

Results

Two reduced-model regressions were conducted, and the results are reported in Table 3. These regressions dissected the total explained variance into components related to the students' characteristics before college, as well as each of the three sets of variables pertaining to their college experiences. Apparently, the model that did not control for students' critical thinking abilities in high school only explained 30.1% of the variance. On the other hand, the model that included this factor had a 52.2% higher explanatory power. At the .001 level of statistical significance, both values are significant.

In addition, the study found that students' course-related and extracurricular experiences had a discernible and statistically significant impact on the explained variance, albeit modest, beyond the influence of students' pre-college characteristics or other college experiences, and this was true even after controlling for students' initial critical thinking ability. Students' college experiences were found to explain an additional 7% to 17% of the variability in their first year critical thinking growth beyond the extent to which their precollege traits were taken into account. Students' non-academic experiences had a similar impact on their critical thinking development (2.9 and 2.5 percentage points, respectively) after taking into account their pre-college critical thinking. After the first academic year ended, a connection was seen between the number of courses students took across fields and their level of critical thinking. This association, however, disappeared when the pre-university critical thinking ability was considered, as the "In" model predicted. The proportion of variance explained by students' academic and extracurricular experiences was, as expected, about halved after correcting for antecedent critical thinking skills.

Two measures of students' learning orientations were found to demonstrate a little contribution to the variation, which could not be attributed to pre-college characteristics or a narrow range of college experiences, by Terenzini, Springer, Pascarella, and Nora (in press). The results showed that this effect varied from 1.8% to 11.2%. The study's shared variance terms, on the other hand, are practically zero.

The final-of-the-year critical thinking ability regression coefficients (also known as beta weights) are shown in Table 4. Each variable's contribution to explaining the total variation is also shown. Even after controlling for students' innate critical thinking skills, a wide variety of pre-university characteristics, course-related variables, and extra-curricular experience variables were found to significantly and individually affect students' critical thinking skills at the conclusion of the academic year. The number of books read outside of school, the amount of time students spent studying, and their parents' level of education were all found to have a significant impact on their children's critical thinking development throughout the course of the first school year.

However, an inverse relationship was found between students' levels of peer connection and their growth in critical thinking. Students are asked to rate their "interpersonal connections with fellow students, student organizations, and extracurricular engagements" on a seven-point Likert scale. To put it another way, a score of one indicates "competitiveness and disengagement," while a score of seven indicates "friendliness, supportiveness, and a feeling of inclusion."The "Out" model found a substantial and novel relationship between critical thinking skills at graduation and a wide range of parameters associated with higher education. End-of-year levels of critical thinking were positively correlated with two factors: the number of science courses taken and the quality of social science education. Students' levels of critical thinking at year's end were found to be significantly inversely correlated with their use of library resources and their attendance at mathematics classes. However, when students' levels of critical thinking skills before college were taken into account, the aforementioned effects disappeared.

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