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Scientific Empirical Study on Analyzing Learning Outcomes of Cadres in College Student Association Using Hierarchical Linear Regression Model †

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Abstract: We investigated the relationship between the personal backgrounds, learning experiences, and learning outcomes of college students serving as student association cadres by applying the indicators of the Council for the Advancement of Standards in Higher Education (CAS) in the United States. The participants of this study were students at the university student associations in Taiwan, and the sampling was carried out through purposeful sampling. We distributed 1850 questionnaires, and 1761 valid questionnaires were received with a recovery rate of 95%. The self-assessed learning outcomes of the student association cadres were good. Among them, "integration and speculation of cognition" was the highest, followed by "integration and application of knowledge", "inner self-development", "interpersonal interaction ability", "practice ability", and "social care and civic literacy". The self-assessment of the student association cadres in their learning experience was also positive. Among them, "experience in engagement" was the highest, followed by "experience in management", "experience in handling activities", and "experience in training courses"; while "experience in participating in activities" was the lowest. Through a hierarchical linear regression analysis of the American CAS learning outcome indicator, the student association cadres' personal background and learning experience had significant explanatory power. The R-squared value of each aspect ranged from 39.6% to 61.1%. It was obvious that the American CAS indicator could be used to examine the learning outcomes of higher education student associations in Taiwan. The results confirm that studying student associations could become an essential approach for cultivating students' learning outcomes and become an essential reference for Taiwan's universities and colleges to promote community education.

Keywords: student association cadres; student associations learning experience; learning outcomes

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1. Introduction

Universities provide professional and extracurricular courses. Therefore, the learning approach for college students can be divided into in-class and out-class. Professors teach in-class courses through various methods such as teaching, practice, and experiments. Out-class courses depend on various course designs that can guide college students to participate, experience, self-examine, and obtain the effect of learning. Whether it is in-class learning or out-class learning, both should be reviewed through evaluation.

Reference [1] believes that learning outcomes refer to the abilities acquired from the learning process. Marsh [2] points out that the student learning outcome should include knowledge, skills, and personality traits. Learning outcomes can be known as the knowledge, technology, behavior, and value brought to students through the teaching

courses provided by the school [3]. Yang [4] points out that many countries often consider learning outcomes in terms of competence; the degree of competence is considered a reflection of the learning outcomes. Marsh [2] believes evaluating learning outcomes in the educational environment will help the students understand the learning objectives, and teachers will master the teaching methods and lesson plans. It has always been an interesting topic for researchers to explore what college students have learned in college, especially in extracurricular activities. Chang [5] contends that the classroom imparts professional knowledge; however, the possibility of students developing talents relies on the learning outcomes that are obtained by students from extracurricular activities. Chen [6] believes that the learning outcomes obtained by students from extracurricular learning can be evaluated at many levels. For example, participation in the association is an important learning activity and is essential for schools to cultivate students' ability to have core literacy. In addition, reference [7] also points out that the experience gained from participating in the association is a critical background condition for entering the workplace in the future, especially for those with association cadre experience, which are the enterprises' targets. Previous studies verify that association cadres are the key to the operation of the association [8–10]. Therefore, it is necessary to use mathematical techniques to establish an evaluation mechanism for the learning experience and achievements of student association cadres.

However, many past studies on the topics of college students in the field of extracurricular activities did not systematically use science and engineering to explore the learning outcomes and related influencing factors. For example, when exploring the issue of college students involved in campus experience, only the variables of community participation were considered [11–13]. After reviewing relevant research, Ref. [7] summarized the learning experience of association cadres into five indicators, including (1) experience in management, (2) experience in handling activities, (3) experience in engagement, (4) experience in training courses, and (5) experience in participating in activities, and compiled a questionnaire for experts and scholars to measure the learning experience of the association cadres.

In addition, Ref. [14] integrated the literature and proposed the following nine core competencies of learning outcomes obtained from extracurricular activities: (1) communication and expression ability, (2) all-life learning ability, (3) team cooperation ability, (4) innovation and creativity ability, (5) problem-solving ability, (6) positive attitude ability, (7) interpersonal ability, (8) critical thinking ability, and (9) international perspective ability. In Ref. [6], the authors distributed 1033 questionnaires according to these nine indicators and concluded that students' extracurricular learning outcomes could achieve the abilities mentioned earlier. The American Council for the Advancement of Standards in Higher Education (CAS) is an important organization that promotes the standards of student affairs, services, and development programs. CAS [15] concluded that the evaluation of learning outcomes includes the following six orientations: (1) integration and application of knowledge, (2) integration and speculation of cognition, (3) inner self-development, (4) interpersonal interaction ability, (5) social care and civic literacy, and (6) practice ability. However, in Taiwan, there is no empirical research on the ability indicators in these six orientations.

Based on the above, this study was carried out to integrate relevant research and the CAS assessment of students' learning outcomes through interviews with experts and scholars and a questionnaire survey. The learning achievement indicators and the connotations of student association cadres were summarized to explore the learning outcome of students' association cadres. Based on a review of the literature, the objectives of this study are defined as follows:

(1) To understand the general situation of the learning experience and learning outcomes of the university association cadres;
(2) To explore the differences in personal background variables on the learning experience and outcomes of the university association cadres;

(3) To explore the relationship between personal background variables, learning experience, and learning outcomes of the university association cadres from a scientific point of view.

2. Research Method

We adopted a questionnaire survey [7] to understand the association cadres' learning experiences and learning outcomes. We used stratified sampling to filter the 155 universities in Taiwan. As a result, 15 universities were selected, including 5 each from northern, central, and southern Taiwan, respectively. A total of 1850 questionnaires were distributed, and 1761 valid responses were returned, with an effective rate of 95%. The questionnaire was divided into the following three parts: personal information, association learning experience, and association learning outcomes. All questions were designed based on a six-point Likert scale. A T-test and variance analysis were conducted to understand the differences in the learning experiences and learning outcomes of university association cadres with different personal backgrounds. Finally, a hierarchical regression analysis was used to explore the relationship between personal background, learning experiences, and learning outcomes of university association cadres.

The Bartlett test, the pre-test through the exploratory factor analysis, showed that a significance level was reached ($p < 0.05$). The KMO values of the students' association learning experience and the learning outcome were 0.932 and 0.963, indicating that the factor analysis was appropriate. Therefore, the formal questionnaire was continued to test the reliability and validity. The KMO values of the student association learning experience and the learning outcome were 0.956 and 0.975. The learning experience was extracted into the following five aspects: experience in management, experience in engagement, experience in training courses, experience in handling activities, and experience in participating in activities. The cumulative variance was 70.13%. The Cronbach's alpha was 0.95, 0.92, 0.91, 0.87, and 0.77 for the five aspects, and the overall reliability was 0.96. The learning outcome was extracted into the following six aspects: integration and application of knowledge, integration and speculation of cognition, inner self-development, interpersonal interaction ability, social care, civic literacy, and practice ability. The cumulative variance was 73.92%. The Cronbach's alpha was 0.95, 0.92, 0.92, 0.93, 0.87, and 0.90 for the six aspects, and the overall reliability was 0.97. Therefore, the questionnaires on the learning experiences and learning outcomes showed a high reliability and validity, and the items of the questionnaire had acceptable internal consistency and stability.

3. Research Findings

The results show that in the learning experiences among the association cadres, the perception of "Experience in engagement" (M = 5.09) was the highest, followed by "experience in organization management" (M = 4.98), "Experience in management" and "Experience in training courses" (M = 4.91), and the "Experience in participating in activities" (M = 4.62). Overall, the perception of the learning experience among the association cadres was significant. In the learning outcomes among the association cadres, perception in "Integration and speculation of cognition" was the highest (M = 5.23), followed by "Integration and application of knowledge" (M = 5.18), "Inner self-development" (M = 5.16), "Interpersonal interaction ability" (M = 5.12), "practice ability" (M = 5.03), and the perception of "social care and civic literacy" (M = 4.74). Overall, the perception of learning outcomes among the association cadres was acceptable.

Regarding the perception of a personal background variable on the learning experience, the *t*-test result showed significant differences in the gender, school attributes, school education system, faculty, grades, association attributes, number of cadres, seniority, positions held, and weekly time devoted to the associations. The results show that the males had a higher perception than the females, private universities had a higher perception than national universities, general universities had a higher perception than the institutes of technology, seniors had a higher perception than juniors, presidents had a higher perception

than general cadres, and the self-assessment of the learning experience of those with more engagement time had higher perceptions than those with less engagement time.

A multiple regression analysis was performed to explore the relationship between the personal background variables of the association cadres and their learning experiences. The results show that the R^2 of "Experience in management" was 0.267, that is, the explanatory power was 26.7%. The R^2 of "Experience in handling activities", "Experience in engagement", "Experience in training courses", and "Experience in participating in activities" was 0.134, 0.096, 0.206, and 0.163 respectively. The personal background factor had a significant difference compared with the learning experience (Table 1).

Table 1. Regression Analysis of Background Variable on Learning Experience.

	Organization Management Experience	**Event Management Experience**	**Association Investment Experience**	**Participation in Training Course Experience**	**Participation in Activity Experience**
R^2	0.267	0.134	0.206	0.163	0.096
F	28.822 ***	13.374 ***	20.509 ***	15.366 ***	8.411 ***
p	0.000	0.000	0.000	0.000	0.000

*** $p < 0.0001$.

The personal background and learning experience were used as predictors, and the learning outcome factor was used as a criterion to proceed with the hierarchical regression analysis to explore the relationship. The results show that the personal background and learning experience significantly impacted the learning outcomes. "Inner self-development" had the highest explanatory power of 61.1%, followed by "Integration and application of knowledge", 59.3%; "interpersonal interaction ability", 52.2%; "Integration and speculation of cognition", 42.8%; and "practice ability", 40.9%. The "social care and civic literacy" had the lowest explanatory power of 39.6%. Overall, the learning experience of the student association cadres had a significant positive impact on the learning outcomes. The results are shown in Table 2.

Table 2. Explanatory Power of the Aspects.

Aspects	**Explanatory Power**
Experience in management	26.7%
Experience in handling activities	13.4%
Experience in engagement	20.6%
Experience in training courses	16.3%
Experience in participating in activities	9.6%
Integration and application of knowledge	59.3%
Inner self-development	61.1%
Interpersonal interaction ability	52.2%
Integration and speculation of cognition	42.8%
Social care and civic literacy	39.6%
Practice ability	40.9%

4. Conclusions and Suggestions

In terms of learning experience, "Experience in engagement" was the most important, while "Experience in participating in activities" was the least important. Overall, the perception of the learning experience of the student association cadres was significant. In the perception of learning outcomes, the perception of "Integration and speculation of

cognition" was the most important, while the perception of "social care and civic literacy" was the least important. Overall, the perception of the learning outcomes of the student association cadres was significant. Student association cadres with different personal backgrounds, such as gender, school attributes, school education system, colleges, grades, association attributes, number of cadres, seniority, positions, and weekly time devoted to associations, had different perceptions of the learning experience and learning outcomes.

The personal background of the student association cadres was significant in the learning experience. "Experience in management" had the highest impact, followed by "Experience in engagement", "Experience in training courses", "Experience in handling activities", and "Experience in participating in activities". As for the results of the learning experiences on the learning outcomes, "Experience in engagement" had the highest impact, followed by "Experience in handling activities", "Experience in training courses", "Experience in management", and "Experience in participating in activities". Overall, the learning experience had a significant positive impact on the learning outcomes.

The study result showed that the accumulation of learning experiences was essential. Higher education practitioners can increase learning opportunities for the student association cadres to participate in and accumulate the learning experiences. According to the results of the learning outcomes, the self-evaluation for students in the "social care and civic literacy" learning outcome was the least important. Therefore, schools must strengthen their engagement in "social care and civic literacy" when providing learning experiences such as contests regarding global issues, international perspective, and civic literacy.

According to the results, the student association cadres who served as the "president", and who had a longer "seniority" and a longer "weekly devotion to the association", had a positive relationship with the learning experience. Therefore, the student association cadres need to undertake the position of "President", devote more time to associate and accumulate seniority and the learning experiences of "Experience in management", "Experience in handling activities", "Experience in engagement", "Experience in training courses", and "Experience in participating in activities". Furthermore, the personal learning experience needs to be strengthened to obtain high-quality learning outcomes, including "Integration and application of knowledge", "Inner self-development", "Interpersonal interaction ability", "Integration and speculation of cognition", and "Practice ability".

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