Selection of the Best Students' Leader in UPNM using Analytic Hierarchy Process Method

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ARTICLE INFO	ABSTRACT
	As university students, it is crucial for them to understand the process of selecting the most suitable student leader based on the current criteria. This research aims to gather input from the high committee of the student club, providing a set of guidelines for students to identify the appropriate criteria for selecting a fitting leader within the university. Additionally, this study serves to motivate aspiring candidates who wish to take up leadership roles, inspiring them to refine the criteria identified through the study. At Universiti Pertahanan Nasional Malaysia (UPNM), there exist several clubs that function as representatives of student leadership. Each club has shown their own trend leadership criteria in accordance with students' obsecration. Employing the Analytic Hierarchy Process (AHP) methodology, this research aimed to establish a ranking of the top student clubs at UPNM. The outcomes can serve as a point of reference for managing the selection by Student Council Representatives (SRC) and simplifying student decision-making. The study encompasses crucial criteria distilled from the questionnaire, with communication, creativity, commitment, and teamwork emerging as the four paramount factors. The method commonly uses a multiple-choice question (MCQ) to select which criteria are most relevant then rank the criteria by using the AHP method. This study involves the high committee of the 5 clubs in UPNM as an expert to compare 3 of the selected clubs as an alternative with 60% of the respondents were male, and 40% were females. The result shows that communication (0.52) is the highest criteria followed by teamwork, commitment and creative with 0.26, 0.14 and 0.08 weightage respectively. Hence, this also affects the alternatives with the highest is Debate Club followed by Peers Leader and MPP UPNM respectively.

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1. Introduction

The growth politic and economy around the world is increasing rapidly. Every day, there are several individuals who have been appointed as a leader either voluntary or not. That is why leadership value is important to develop in each of us. Nowadays, leadership skills are the most essential thing to ensure that every plan went smoothly. Our voting system in Malaysia gave a chance for our society choose their leader according to their favour. Due to that, education is not an exception from this democratic system, especially higher institution. Additionally, in higher institutions the exposure of leadership is important to develop a leader of character to ensure they have a better soft skill in their future. Every interest of leadership style changes from time to time according to the suitability.

Every student's decision to choose the leader that led to their better future right is very important. Not only do they get a good environment for their study life, but it will also ensure that they do not choose an irresponsible leader. Some decisions are tough to make and require careful thought. The problem undergoing research is determining the competent leader for the student qualify to vote their leader and still cannot justify the best leadership quality that must in National Defence University of Malaysia (UPNM).

One of the issues that in selection of best leader in UPNM is there are certain leader have been chosen because of the popularity without the student look on their competency to be a leader. UPNM student have not been exposure to various parties like other university that made UPNM student has a literacy in politic knowledge led to student choose the leader without any preference or randomly. Another issue that can be considered by the management self-preferred of the selection leader in UPNM. Some leaders appointed because of their previous experience in the same position. This situation has made the management comfortable with them and tends to choose the same person for the next organization. The situation is worse because it will lead to bias system and lead to denying a student right. The method used is Analytic Hierarchy Process (AHP). AHP is a technique employed in business to arrange and assess complex decisions, utilizing mathematical principles. It was invented by Thomas L. Saaty in the 1980s and has continued to be refined after the time of his death. The discussion above precedes the problem statement and is used to develop the objective that needs to be addressed, identify a range of possible solutions (alternatives), and establish the criteria by which the writer will evaluate these alternatives [18].

Based on the problem statements discussed above, the questions for this study are:

i. How to elect the best leader as students' representative without abandoning democracy?
ii. What are the current criteria of preference for UPNM students?
iii. Which club meets the requirements for having the best students' leader?

Therefore, the significance of this study is to aid students and equivalent to choose the best leader in UPNM when they want to choose their leader or cast a vote. This research also allows the management to evaluate the suit criteria, as well as the competent leader which may be used to create future improvements. To ease the students' choices because this research has covered the important criteria that are commonly valued when choosing the leader.

2. Literature Review

According to Black [5], Since the 1980s, growing student enrolment, adjustments to financing for student spaces, more student choice, and ongoing globalization have all put additional pressure on higher education institutions' leadership. Throughout this period of transition, educational institutions are expected to consider how to educate their leaders and what appropriate leadership behaviour might be. When the various leadership paradigms seen in the educational activity sector are contrasted with existing leadership theory and practice, it is possible to identify additional complexities in the development of higher education leaders. If the practicalities of educational activities are given more thought, competency frameworks may be able to help with leadership development. Artamonova *et al.,* [4] emphasized that a lot of people have talked about developing their leadership qualities for a long time. The significance of a leader in ensuring economic and social well-being is emphasized in a variety of management, psychology, and sociology literature. Numerous academics have developed and categorized criteria for assessing leadership. According to Druguș and Landøy [7], students want leaders to have the following qualities: foresight, conveyance of information, engagement, enthusiasm, high expectations and appreciation of outcomes, a continuous individual and organizational dynamic, and the ability to support differences and similarities. Leadership is based on viewpoint, direction, and the completion of the leading process, looking to the future (foresight-based leadership), or focused on defining a plan for the organization to follow to achieve its goals (strategic leadership). As example Muteswa [10] clarified the trouble being confronted through today 's companies are that they're both covered or underlined as a consequence they want to growth their main capacities with a view to workout balanced management. Generally, management takes place while there may be a dating among the chief (person who intends to lead) and the individuals who choose to follow (followers). This takes a look at targets to check literature associated with the features of a very good chief and the blessings of desirable management to the business enterprise with the intention to set up gaps.

According to Pani [12], the concept of good leadership is often viewed as a solution for various societal and organizational problems. It plays a crucial role in driving a nation towards competitiveness and achievement. Effective leadership has the ability to guide a country towards becoming a world leader. With the current emphasis on knowledge economies, a nation's higher education system can be a key factor in propelling it towards superpower status and global leadership. In essence, the higher education system of a country has the potential to be a driving force towards leadership and success. Meanwhile, Artamonova *et al.,* [4] stated that the core leadership qualities of these models differ: professionalism, personal drive, accountability, initiative, and cognitive talents. Leadership skill development is a time-consuming and labour-intensive process in which training and education are critical. It is clear that humanities may assist in building emotional intelligence, foresight, leadership, and extend perspectives. According to the study, the correct structuring of the educational process can lead to the development of new behavioural models. This is achievable through the use of practice-oriented training, case studies, and game education technologies. However, implementing such leadership development methods in humanitarian courses places additional responsibility on teachers and university administrators to uphold the mission of educating individuals, introducing them to modern culture, and preparing them to navigate the contemporary world in a way that fosters authenticity. Abed Aljasim Muhisn *et al.,* [1] outlined the procedures used to choose the best team leader utilizing the Analytical Hierarchy Process (AHP) approach. Four factors—personality type, academic success, teamwork experience, and prior programming grade—were used to identify the top team member in an educational group project. Omar *et al.,* [11] stated the knowledge of recognizing and comprehending essential factors

for forming team members is advantageous, particularly for the Social Engineering community. Furthermore, adopting the suggested approach can assist decision makers, notably instructors, in forming productive team members. This work might be enhanced by incorporating a hybrid method to increase model accuracy. Furthermore, the suggested model may be developed and tested in an industrial scenario. Zendeh and Aali [19] stated that choosing the proper leadership style is a crucial issue in businesses. Although there is a large body of research on the subject, there are few mathematical models to help determine it. Contingency theories are used in this study. It is a Multiple Attributes Decision-Making (MADM) decision to choose the best leadership style based on these notions. AHP, one of the efficient approaches utilized in this field, was employed to construct a model for it. Although contingency variables are interrelated, they are treated as independent variables in the AHP technique. Although contingency variables as criterion may be separated into sub criteria, those were not explored in this article, therefore future research can focus on these constraints.

Smith *et al.,* [17] emphasized that the selection of bridge materials by highway officials across the United States was characterized using the Analytical Hierarchy Process (AHP). This approach helped to develop strategies for promoting the use of timber in bridge construction by understanding the decision-making process. To gather information on the factors that influence the choice of bridge material, interviews were conducted with State Department of Transportation engineers, private consulting engineers, and local highway officials in Mississippi, Virginia, Washington, and Wisconsin. On the other hand, Saaludin *et al.,* [15] stated by gathering peer opinion and suggesting new criteria for the SRC nomination procedures, this research has significantly influenced the development of UniKL's leadership curriculum for todays and tomorrow's student leaders. In conclusion, the SRC candidates' leadership criteria may be ranked using the AHP technique. According to Agustina *et al.,* [3] five criteria from the digital leadership model and four alternative computations were used in the AHP method application to calculate the ranking of principal school selection, which led to a reasonably selective ranking [21]. The rating findings may be used to inform decisions on which leader best meets the standards for digital leadership. Alternatives that satisfy the criteria for being chosen as the principal with the finest digital leadership qualities are produced from the calculation results.

Other than that, Mohamed *et al.,* [9] said it can be argued that the AHP approach is a straightforward and easy technique to adopt by any decision maker, especially if it includes the viewing and evaluation of several options at the same time. It is also adaptable and simple to use in determining the preferred choices. According to Adnan *et al.,* [2], based on the findings of their study, it can be said that the AHP (Analytical Hierarchy Process) approach may be used to apply a decision support system in order to analyse how leadership style affects employee motivation. Two characteristics that have a good influence are the delegating style and the directing style with the greatest value, according to the findings of the calculation of the five criteria for leadership style. Damdinsuren and Ishdamba [6] found that project management involves complicated decision-making scenarios that need discernment and decision- making procedures. The AHP was introduced in the article as a decision-making tool that allows for the evaluation of many factors. The purpose of the contractor prequalification study was to demonstrate the application of AHP in project management. Contractor prequalification comprises developing criteria and priorities based on the needs and preferences of the owner, as well as the characteristics of the specific contractors.

When the various leadership paradigms seen in the educational activity sector are contrasted with existing leadership theory and practise, it is possible to identify additional complexities in the development of higher education leaders. If the practicalities of educational activities are given more thought, competency frameworks may be able to help with leadership development. As example Muteswa [10] clarified the trouble being confronted through today 's companies are that they're

both covered or underlined as a consequence they want to growth their main capacities with a view to workout balanced management. This takes a look at targets to check literature associated with the features of a very good chief and the blessings of desirable management to the business enterprise with the intention to set up gaps. It is the fundamental driver of national competitiveness and success. Meanwhile, Artamonova *et al.,* [4] stated that the core leadership qualities of 10 these models differ: professionalism, personal drive, accountability, initiative, and cognitive talents. The study shows the formation of new behavioural models as a result of the logically correct structuring of the educational process.

In conclusion, AHP is commonly use to choose a best one in any medium. From the literature review study, it must fulfil the term and condition of AHP which is criteria and alternative. Best quality leadership will be defined in this technique as it will use a majority answer in questionnaire.

3. Methodology
3.1 Data Pre-Processing

This research is focused on the selection of the best leaders in the UPNM. The scope of this research is among the high committee of the club in UPNM. To get an accurate criterion, the research does not highlight any criteria until each decide their own stance. Club in UPNM is one of the important entities to ensure that they comfort to cooperate with. So, it is very important for them to have a discussion for the additional in SRC selection to make a better future. Hence, they will rank a criterion that must be prioritized.

The focus club discussion will be held to ascertain the club's expectations of SRC candidates. The debate focused on the critical conditions for an SRC. Five active Clubs in UPNM were chosen to determine their vital qualities. The debate will be commencing on November 2022.

The participants in the focus club discussion are:

  i.   Volunteering Club (KELKES),
 ii.   Sahabat Al-Fateh (SAF),
iii.   Science and Technology Club (DESTEC),
 iv.   Foundation Club (JPPA),
  v.   Dormitory Club (MTKK).

The expectations of clubs toward SRC were defined based on appropriate leadership qualities to generate extra standards in filtering SRC applicants. The expectations were organized into skill sets in the questionnaire, which served as the criterion for leadership. There are 24 questions that are related to 6 Criteria, each club must discuss for choose only 12 important of sub-criteria. Next, the top five criteria will be ranked with numerical value based on criteria according to the number of students who choose it. After that, the criteria were arranged in decreasing order. Result from the random questionnaire shown 4 criteria that has being selected and choose by 5 chosen Clubs.
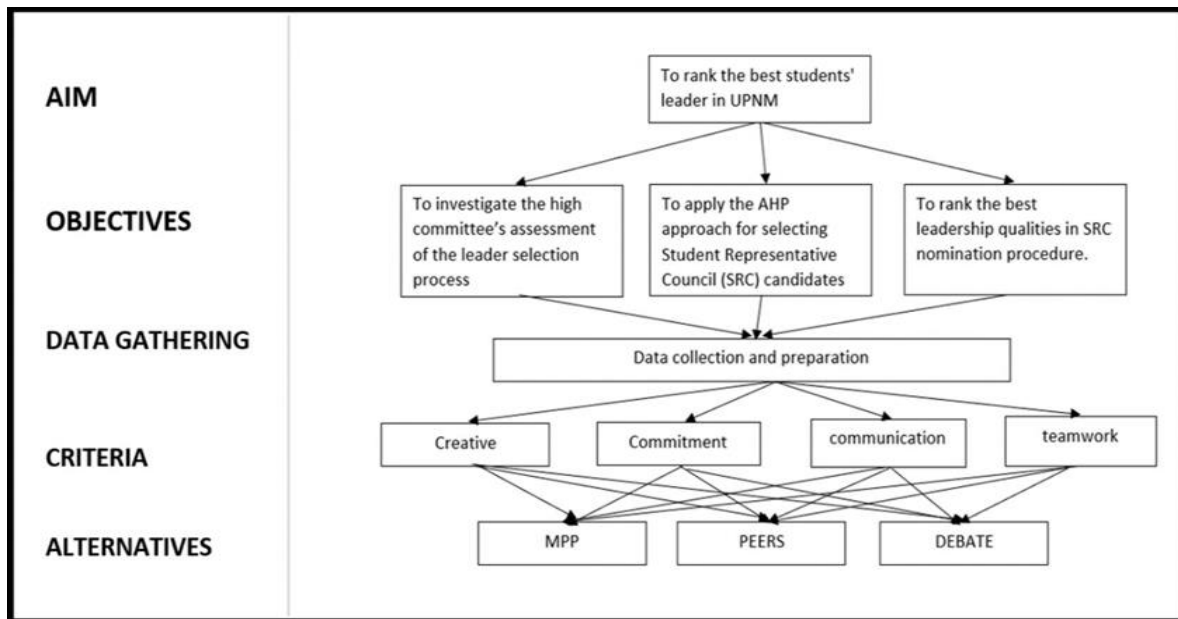
Fig. 1. Flowchart of research design

Firstly, fill the data by using Pairwise Comparison. To construct the AHP matrix, we only need to fill the upper triangular matrix since the diagonal elements are always 1. To fill the matrix, we use a set of rules: if the judgment value is less than 1, we put the actual judgment value in the matrix cell; if the judgment value is greater than 1, we putthe reciprocal value of the judgment value in the matrix cell (see Eq. (1)).

$$\begin{bmatrix} 1 & a & b \\ \frac{1}{a} & 1 & c \\ \frac{1}{b} & \frac{1}{c} & 1 \end{bmatrix} \tag{1}$$

Secondly, Priority vector, also known as the normalized principal Eigen vector. The corresponding positive non- zero reciprocal matrix example is tabulated as shown in Eq. (4). The matrix is to be normalized eigen vector corresponding to its principal eigenvalues. In the normalization, the first step would be summing the numbers in eachcolumn as shown in Eq. (2). Each entry in the column is then divided by the column sum to yield its normalized score (see Eq. (3)). Normalized score is tabulated as in matric (Eq. (4)). The sum of each column is supposedlyto be 1.

$$C_{ij} = \sum_{i=1}^{n} C_{ij} \tag{2}$$

$$X_{ij} = \frac{C_{ij}}{\sum_{x=1}^{n} C_{ij}} \tag{3}$$

$$\begin{bmatrix} X_{11} & X_{12} & X_{13} \\ X_{21} & X_{22} & X_{23} \\ X_{31} & X_{32} & X_{33} \end{bmatrix} \tag{4}$$

The weight can be found by the normalized principal Eigen vector obtained by averaging across the rows. The normalized principal Eigen vector is also called priority vector. The normalized principal Eigen vector is also called priority vector. It is obtained in an approximate manner by calculating the

mathematical average of all criteria referringto Eq. (5).

$$W_{ij} = \frac{\sum_{j=1}^{n} x_{ij}}{n} = \begin{bmatrix} W_{11} \\ W_{12} \\ W_{13} \end{bmatrix} \tag{5}$$

Next, check the consistency by calculate Consistency Index (CI) and Consistency Ratio (CR). To do that, need to use Principal Eigen value. Principal Eigen value is obtained from the summation of products between each element of Eigen vector and the sum of columns of the reciprocal matrix (see Eq. (6) and Eq. (7)).

$$\lambda_{max} = \frac{1}{n} \sum_{i=1}^{n} \left\{ \frac{\sum_{j=1}^{n} a_{ij} \times w_j}{w_t} \right\} \tag{6}$$

$$CI = \frac{\lambda max - n}{n - 1} \tag{7}$$

Lastly, the consistency of the AHP will be determined by the value of CR from the pairwise comparison table. CI will be divided with the If its value is for the case exceeding 0.1 according Saaty (2002) is not consistent, pairwise comparison has to perform again referring Eq. (8).

$$CR = \frac{CI}{RI} \tag{8}$$

3.2 Data Analysis

Phase 3 will be divided into two parts which is preliminary data analysis and main data analysis. The preliminary data analysis will include prescriptive data analysis. Descriptive data analysis combines the insights of all previous analyses to determine current issues and actions to be taken in making decisions. Data visualization is to present the data graphically so that it can be easily understood.

In main data analysis, AHP and data interpretation will be applied. The results are then used to make decisions and ranking. By that, relationships can be observed, unknown facts and trends can be discovered with meaningful information.

4. Results
4.1 Preliminary Data Analysis

Descriptive analysis was conducted to understand the respondents' characteristics in detail. Social demographic data (year of study, gender, and club background) were used to answer the questionnaire. A total of 5 subjects from each representative Clubs of National Defence University Malaysia (NDUM) were participated in this research, with 60% of the respondents were male, and 40% were females. In this research, the fourth-year students and second-year students has an equal number of respondents which is 40% while 20% of first-year students. The distribution of the respondents according to the program were same which 20% respectively.

4.2 Main Data analysis

Based on Table 1, The finding shows that communication has the highest weightage as compared to other criteria. It is indicated that these criteria are dominant and must be prioritized during the process of SRC selection. The communication criteria formed the weightage of 0.52 followed by teamwork, commitment and creative with 0.26,0.14 and 0.08 weightage, respectively.

Table 1
Criteria Comparison Result

Criteria	Rank	Weightage
Creative	4	0.08
Communication	1	0.52
Teamwork	2	0.26
Commitment	3	0.14

As the criteria has been calculated which has a big weightage, next calculate the students' preference according to each criterion to get the best alternatives. Based on Table 2 to 5, The findings show that student preferer Debate UPNM has indicated the highest in communication skill which is 0.67 followed by Peers leader (0.20) and MPP UPNM (0.13). In teamwork skill, student preference is Peers leader that indicated 0.59 followed by MPP UPNM (0.25) and Debate UPNM (0.16). Next, student preference based on commitment MPP UPNM has indicated highest weightage which is 0.77 followed by Debate UPNM (0.14) and Peers leader (0.09). Last but not least, students prefer Peers leader which has the highest weightage which 0.66 followed by Debate UPNM (0.26) and MPP UPNM (0.08). The criteria weightage produced by the panel of experts were viewed as valid and parallel with past research done by Luthra, Dr [20] once said effective communication acts as an advantage of a leader to lead effectively.

Table 2
Student Preference Based on Communication Result

Criteria	Rank	Weightage
MPP UPNM	3	0.13
DEBATE UPNM	1	0.67
PEERS LEADER	2	0.20

Table 3
Student Preference Based on Teamwork Result

Criteria	Rank	Weightage
MPP UPNM	2	0.25
DEBATE UPNM	3	0.16
PEERS LEADER	1	0.59

Table 4
Student Preference Based on Commitment Result

Criteria	Rank	Weightage
MPP UPNM	1	0.77
DEBATE UPNM	2	0.14
PEERS LEADER	3	0.09

Table 5
Student Preference Based on Creative Result

Criteria	Rank	Weightage
MPP UPNM	3	0.08
DEBATE UPNM	2	0.26
PEERS LEADER	1	0.66

To get the weightage result of the best alternatives, each weightage of student preference will multiply with the criteria weightage. Then, adding each total of the weightage.

Based on Table 6, the highest total weight comes from debate clubs as it indicates the most weight in the highest criteria that is communication with 0.35 and the lowest weight comes from MPP UPNM as it indicates the lowest weight in lowest weightage of criteria that creative with 0.006. It's predictable that students nowadays want a leader who has a good communication skill to voice out their right in proper way to the university management. This is due to the fact that student face with many welfare issues after the pandemic.

Table 6
Summary Result

Criteria	Criteria	Multiply Weightage	Total
MPP UPNM	Communication	0.07	0.256
	Teamwork	0.07	
	Commitment	0.11	
	Creative	0.006	
DEBATE UPNM	Communication	0.35	0.431
	Teamwork	0.04	
	Commitment	0.02	
	Creative	0.021	
PEERS LEADER	Communication	0.10	0.313
	Teamwork	0.15	
	Commitment	0.01	
	Creative	0.053	

Hence, a leader with good communication skill can convince higher-ups more to voicing students' issue. The best club that almost fulfilled the students 'leader criteria based on the ranking is as followed. Based on Table 7, most of the students have chosen Kesatuan Debat UPNM because it has a higher rank in communication criteria and second higher for Commitment and Creative criteria.

Table 7
Alternatives Result

Criteria	Rank	Weightage
MPP UPNM	3	0.256
DEBATE UPNM	1	0.431
PEERS LEADER	2	0.313

4.3 Consistency Index (CI) and Consistency Ratio (CR)

The consistency ratio (CR) obtained is 0.08 which is less than 0.1, which indicates that the judgement given by the expert was consistent, as stated by Saaty [16]. Hence the judgment given by respondents were considered as consistent. The weightages produced are valid and aligned with Saaludin *et al.,* study [15]. Based on consistency ratio (CR) of result student preference according to

the criteria considered for Table 2 to Table 5 has shown that the result is acceptable as the judgement given also consistent.

5. Conclusions

In conclusion, the findings from this study demonstrate that communication is the most significant criterion for students, followed by teamwork, commitment, and creativity. The results suggest that students require leaders with good communication skills to voice their concerns effectively to the university management, particularly in light of the numerous welfare issues that have arisen due to the pandemic. Kesatuan Debat UPNM is the most popular choice among students because of its high rank in communication and commitment criteria. To improve the accuracy and reliability of the results, future research should include more criteria and extend the study to a broader sample of students. Although the initial intention was to reach all students with the AHP questionnaire, time constraints made this unfeasible, and ensuring consistency in calculations proved challenging. Additionally, to enhance the research experience for respondents and reduce the time it takes to complete the research, it is recommended that the questionnaire platform be replaced with an alternative to Google Forms.

Acknowledgement

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