# An Enhanced Systematic Student Performance Evaluation Based on Fuzzy Logic Approach for Selection of Best Student Award

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**Abstract**: The Best Student Award is one of the incentives initiated by an institution to identify potential students who are not only excellent academically, but also possess great leadership skills. Moreover, these skills may also be enhanced which subsequently contribute to the future of society. Nonetheless, one of the greatest challenges faced by evaluators in the selection process include uncertainty and imprecise data in measuring the students' leadership competencies. Thus, this paper proposes the development of Initiative-Systematic Performance Evaluation (I-SPE) as an initiative tool to measure students' competencies based on Fuzzy Logic Approach. The study focuses on the selection of the best student based on data collected from a leadership programme – Program Kepimpinan Pewaris Bangsa (PKPB) conducted at Universiti Teknologi MARA (UiTM) Cawangan Sarawak, Mukah Campus. In the current practice, tie and time-consuming challenges due to the subjectivity and complexity of measurement criteria are involved. Therefore, I-SPE will assist to provide an improved decision-making solution to evaluators during the evaluation process. Fuzzy logic tools used to develop I-SPE allow the experts to introduce any uncertainty and subjectivity into the evaluation system. The development of fuzzy rules in this model is based on five selected attributes, which include leadership, communication, teamwork, discipline and CGPA. Results obtained indicate that the proposed model I-SPE is able to improve decision-making efficiency that would lead to fairness in selecting the best candidate as compared to the conventional method.

**Keywords**: Evaluation, Fuzzy logic, Initiative, Leadership, Student's Award

## 1.    Introduction

The Student Award is one of the initiatives introduced to recognise potential students who deliver excellently not only in academics, but also the ability to foster great soft skills such as leadership, discipline, teamwork and communication. Undeniably, these skills must be identified and nurtured for students' self-development. Thus, it is crucial for evaluators to develop a detailed assessment and make a fair and equitable decision. A case study at Universiti Teknologi MARA (UiTM) Cawangan Sarawak, Mukah Campus is presented in this study to demonstrate the applicability of the proposed developed system, I-SPE based on Fuzzy Logic Approach. The secondary data taken from *Program Kepimpinan Pewaris Bangsa* (PKPB) was used as the parameter input in this study. PKPB is an exclusive human capital development programme established by *Institut Kepimpinan Pelajar* UiTM Shah Alam for Diploma and Degree Programmes across all UiTM systems nationwide. This is a compulsory programme focusing on non-academic performance aiming to produce graduates with first class mindset and who possess great personality and professionalism as required by the Ministry of Higher Education. The education system has been specifically designed to educate and prepare young minds for their future and ultimately the workforce (Ismail, Bakar & Mohamed, 2019) as these graduated students are the country's human resources. Outstanding academic qualification, working experience and competency in the area of specialization are very important in the selection of an individual into the workplace (Abdullah, Noah, Othman, Wan Jaafar, Borhan, Abdul Karim, & Konting, 2012). Moreover, employers today desire graduates with not only good basic skills for certain fields, but also at their competitive attitude (Ma'dan, Ismail, & Daud, 2020). This is why it is important to prepare the students with modules that can boost soft skills performance, as offered in PKPB.

The programme consists of three modules and each module is scheduled with activities targeting soft skills performance such as orientation, lecture talk, team training, problem-solving and communication skills involving a group of selected students from various clubs and internal associations within UiTM. However, PKPB in UiTM Mukah Campus only receives participation from Diploma Programme as the Degree Programme is not offered in the campus. In the course of handling PKPB, the Student Leadership Unit (SLU) is responsible to organize all three modules every semester since its establishment. Towards the end of semester, the SLU Coordinator will request club advisors to nominate a maximum of two candidates from a total of 13 clubs and internal associations to take part in the programme. These modules aid in determining the best group of candidates to be awarded with the Leadership and Curriculum Award in order to honour students with exceptional leadership skills. Nevertheless, most of the decisions are made based on evaluators' mere observations on specific skills standard without any systematic measurement to evaluate students' leadership competencies in the current practice.

Traditionally, the panels or evaluators who normally consist of Head of Centre, Coordinator of Student Leadership Unit and PKPB facilitators, will discuss among themselves in a meeting to select the two most outstanding students representing two faculties in UiTM Mukah Campus, namely Faculty of Business and Management as well as Faculty of Plantation and Agrotechnology, based on the recommendation of 20 candidates sent by advisors. Subsequently, these two students are re-evaluated to determine the overall best candidate for the award. Often, this conventional method is subjective, may result in a tie and is time-consuming since different evaluators might have different point of views and opinions. This decision-making process becomes more complicated because there are many aspects to be considered such as leadership, communication, teamwork, discipline and CGPA. Consequently, this kind of practice might lead to biases such as prejudice, favouritism and stereotype in determining the final candidate. Ultimately, there will always be a risk of unfairness and biases that could influence evaluators, thus leading to inaccurate decisions by selecting less performing candidates instead. Therefore, the development of a more systematic approach is significant to measure and help in deciding the best recipient for the Leadership and Curriculum Award, who represents human logical sense, opinion and recommendation.

In terms of a fuzzy logic system, Amelia, Abdullah & Mulyadi (2019) reviewed that there is a wide range of applications of fuzzy logic in the education evaluation system. A total of 97.37% of the 38 reviewed articles believed that fuzzy logic methods could have a positive effect on the evaluation system. This method has the ability to deal with decision-making that involves some degree of uncertainty, vagueness, and imprecision. It allows the transition of conventional decision making to a

more flexible and various evaluation opportunities. In many cases, the use of experts in various fields is necessary (Ezzabadi, Saryazdi & Mostafaeipour, 2015). Thus, the proposed model, Initiatives Systematic Student's Performance Evaluator (I-SPE) is developed in this study with the objective to assist in the decision-making process made by evaluators in selecting the best student that will be qualified for the Best Student Award. The model uses a Fuzzy Logic approach, which allows the experts to introduce uncertainty and subjectivity into the evaluation system.

## 2.    Literature Review

In today's modern world, fuzzy logic has been extensively used by the decision-makers in dealing with uncertainty during the decision-making process. Fuzzy logic is an extension of multivalued logic which deals with approximate rather than precise modes of reasoning (Zadeh,1988). It is employed to handle the concept of partial truth where the truth values of variables may be any real number range between 0 and 1 instead of using precise values 0 or 1 to represent true or false respectively. The ultimate aim of this study is to develop a systematic student's performance evaluation based on a fuzzy logic approach in order to improve the existing system employed by Universiti Teknologi MARA, Cawangan Sarawak, Mukah Campus.

The term fuzzy logic was first coined and introduced by Lotfi Zadeh, the father of Fuzzy Set Theory in 1965, even though the concept had been studied since the 1920s. He pointed out that the ordinary computer logic was unable to manipulate data representing subjective or obscure human ideas. Interestingly, as fuzzy logic has an ability in dealing with degree of uncertainty, vagueness, and imprecise data in decision-making, its application has a wider scope of applicability in the field that involves pattern classification and information processing (Zadeh, 1965). In early years, the application of fuzzy logic was widely practiced by the Japanese in the field of engineering such as automatic train operation (Hitachi), vehicle control, robot control, speech recognition, universal controller and stabilization control (Zadeh, 1988).

As a result of the success of fuzzy logic application in the engineering field, it has attracted considerable attention from numerous fields and is widely applied to various fields including education. Amelia et al. (2019) indicated there was an increasing pattern of interest among researchers towards the study on the application of fuzzy logic in the education evaluation system. They found that the fuzzy logic approach has become one of the best approaches to evaluate student performance due to its ability to reduce ambiguity in evaluation. Undeniably, it is more significant in dealing with subjective and imprecise data compared to the traditional average rating method that is widely used. Numerous studies have introduced the application of fuzzy logic approaches in the education system for evaluation purposes. These researches covered various levels in education from preschools to higher learning institutions. In preschool level, Pazil, Mahmud, Jamaluddin, Mazlan & Rahman (2018) conducted a research in 17 selected preschools in Johor where a fuzzy logic approach was implemented to evaluate the performance and quality of preschool. Four major factors were used as input parameters in their study namely physical, socio-emotional, spiritual and intellectual of the preschool children in their learning process. Output obtained through this study showed five selected schools were identified as successful in their learning process.

In secondary school level, Gran, Ajol, & Ali (2019) conducted a case study in one of the secondary schools in Mukah, Sarawak. The objective of the study was to propose an alternative for a systematic students' performance evaluation tool based on a fuzzy logic approach to identify the most qualified student to be awarded as the Best Student in the school. It was found that the Fuzzy logic approach was useful and beneficial to the school by providing an efficient tool in solving the problems encountered by evaluators during the evaluation process. Undeniably, one of the problems was solved

when applying a fuzzy logic approach by measuring the imprecise data such as students' behaviour at school and roles or responsibilities held by each candidate.

Similarly, multiple researches were conducted on the application of fuzzy logic approach in evaluating university students' performance. Yadav & Singh (2011) introduced academic performance evaluation using soft computing technique where the development of their model includes the combination of fuzzy logic techniques. Subsequently, Yadav, Soni & Pal (2014) proposed New Fuzzy Expert System (NFES) as an alternative to be used by educators to evaluate students' academic performance and their proposed method contributed to better decision-making when compared with the existing statistical method. Both of these studies were based on academic assessment. Additionally, Barlybayev, Sharipbay, Ulyukova, Sabyrov, & Kuzenbayev (2016) also proposed the application of a fuzzy logic model to evaluate student's performance. Their study was based on academic assessment such as mark scores in lecture, practical lesson, studio sessions, self-work of students and laboratory work to represent the overall students' performance. Recently, Aziz, Golap & Hashem (2019) proposed an application of Fuzzy Inference System (FIS) to evaluate students' performance by considering the continuous assessment in their learning programme. Their method includes the students' attendances, total time spent by the students in class and also their test marks in class and final exam results as input to determine the students' performance. It is crucial to ensure a fair assessment using appropriate techniques when evaluating students' academic performance (Sarahintu, Tarmudi & Lepit, 2017). In fact, many institutes honour a student by granting the Best Student Award based on their all-round performance (Patil, Mulla, & Mudholkar, 2012). Additionally, Patil et al. (2012) focused on the application of fuzzy logic to evaluate the students' performance according to their academic and this includes three criteria namely hardwork, depth of knowledge and technical knowledge.

Apparently, based on an extensive literature search, most of the studies conducted on the application of fuzzy logic approach are focusing on academic criteria to evaluate students' performance. Thus, this paper aims to propose the development of Initiative-Systematic Performance Evaluation (I-SPE) as a tool to measure student's competencies based on Fuzzy Logic Approach with inclusion of non-academic criteria in selecting the most qualified recipient for the Best Student Award. Indeed, it is necessary to include non-academic criteria such as soft skills in the students' performance evaluation as it is equally important as academic criteria.

To add, there are substantial studies that include soft skills in the evaluation system. A study conducted by Abdullah et al (2012) focused on evaluating student performance by considering communication skills, leadership skills as well as lifelong learning and information management skills. Other than that, a study was also conducted by Tarmudi, Sarahintu & Lepit (2015) for Pre-Diploma level students which discussed the comprehensive evaluation of student performance based on both academic performance and soft skill for university recognition purposes. It was aimed to handle the problems that arose in the common practice of evaluating the student performance based on their exam grade. Nonetheless, this evaluation system may not reflect the genuine qualities of student performance without using a rubric. As a matter of fact, it is difficult for the evaluator to determine the parameter values as an input in a fuzzy logic system without giving them the range of scores and assigning meaning for each score in each criteria. In other words, by designing a rubric, it is easy to assign students based on the range of classification provided. Furthermore, Tay, Chen & Lee (2009) clearly stated that the rubric is an essential scoring tool for subjectivity assessment.

Moreover, there were two studies (Tay et al., 2009 and Rao, Mangalwede & Deshmukh, 2017) which investigated student performance evaluation based on application of fuzzy logic models that involved the designing of scoring rubrics input criteria. Tay et al. (2009) presented a novel Fuzzy Inference System-based CRA model that provided an aggregated score as a measure of overall achievement where subjectivity was involved. The study included assessment of students' activities in Electronic Circuitry Design, Electronic Circuitry Development and presentation. Meanwhile, Rao et al.

(2017) proposed an application of Fuzzy Inference System (FIS) to evaluate student performance including designing scoring rubric criteria and the 5-input used in their study are identify, understand, apply, analyse and design. Although both studies employed scoring rubrics in an input process of fuzzy logic approach to evaluate the student performance, their criteria in evaluation were only based on academic performance.

Hence, this paper proposed a development of an evaluation system based on an application of fuzzy logic to evaluate student performance by not emphasizing merely on academic criteria (CGPA) but also to include non-academic criteria such as leadership, discipline, teamwork and communication skill. In addition, the present scoring rubric assessment was designed specifically to provide evaluators with a clear guideline. It is very crucial for the evaluators such as educators and top management to evaluate student performance fairly and transparently as their decision will have an impact on the students particularly upon graduation and job application in the future. Most importantly, the development of I-SPE in this study is aimed to solve the uncertainty problem frequently faced by the evaluators in selecting the best student by providing them with an improved systematic student performance evaluation system.

### 3.    Methodology

Research framework adopted in this study is outlined in Figure 1.
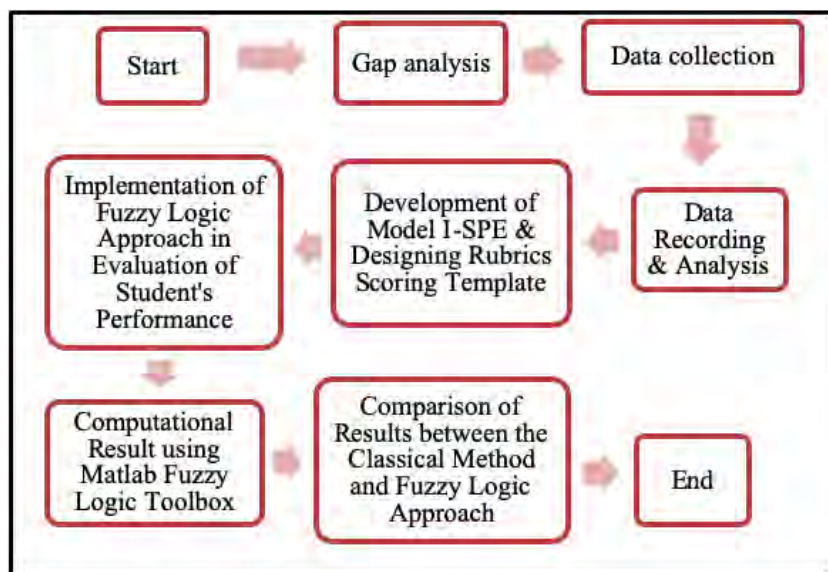


**Fig. 1** Flow chart for the research framework

Fuzzy rules developed in this model were based on five selected attributes, which are leadership, communication, teamwork, discipline and CGPA. Figure 2 below shows the Rubric Scoring Template that is useful as a clear guideline to the evaluators in the process of selecting the most qualified recipient for the Best Student Award. It is designed specifically to assist the evaluators in classifying the score input range for each criterion obtained by the respective candidates.

| Attribute | Sub attribute | RATING (1-10) | | | | |
|---|---|---|---|---|---|---|
| | | 1 -2<br>POOR | 3–4<br>UNSATISFACTORY | 5–6<br>SATISFACTORY | 7–8<br>VERY SATISFACTORY | 9–10<br>OUTSTANDING |
| Leadership | Knowledge and skills in leadership | No clear evidence of knowledge and understanding skills in leadership | Able to demonstrate knowledge and understanding in leadership but require improvements | Able to demonstrate knowledge and understanding in leadership and require minor improvements | Able to demonstrate knowledge and understanding in leadership well | Very clear evidence of knowledge and understanding demonstrated in leadership |
| Teamwork | Foster good relationship | No clear evidence of ability to foster good relationship and work together effectively with other group members towards goal achievements | Able to foster relationship and work together with other group members towards goal achievement but with limited effect and require improvements | Able to foster relationship and work together with other group members towards goal achievement with some effect(s) and require minor improvements | Able to foster relationship and work together with other group members towards goal achievement | High ability to foster relationship and work together effectively with other group members towards goal achievement |
| | Group participation | Not able to collaborate, contribute and cooperate in group | Limited ability to collaborate, contribute and cooperate in group | Able to collaborate, contribute and cooperate in group | Able to collaborate, contribute and cooperate well in group | Able to collaborate, contribute and cooperate well in group |
| | Respect and accept opinions | Not able to respect and accept opinion of others that leads to conflicts | Limited respect and acceptance of others opinions in achievement group's objective | Able to respect and accept opinion of others in achieving group's objective | Able to well respect and accept opinion of others in achieving group's objective | Able to very well respect and accept opinion of others in achieving group's objective |
| Discipline | Practice of self-restraint and follow course of action | Not able to practice self-restraint and learning to follow the best course of action towards goal achievements | Limited ability to practice self-restraint and learning to follow the best course of action towards goal achievements | Able to practice self-restraint and learning to follow the best course of action towards goal achievement | Able to well practice self-restraint and learning to follow the best course of action towards goal achievement | Able to very well practice self-restraint and learning to follow the best course of action towards goal achievement |
| Communication | Clear delivery of ideas | Not able to deliver ideas clearly and require major improvement | Able to deliver ideas and require further improvements | Able to deliver ideas fairly clearly and require minor improvements | Able to deliver ideas clearly | Able to deliver ideas with great clarity |
| | Confident delivery of ideas | Not able to deliver ideas confidently | Able to deliver ideas with limited confidence and require further improvements | Able to deliver ideas fairly confidently and require minor improvements | Able to deliver ideas confidently | Able to deliver ideas with great confidence |
| | Effective and articulate delivery of ideas | Not able to deliver ideas effectively | Able to deliver ideas with limited effect and require further improvements | Able to deliver ideas fairly effectively and require minor improvements | Able to deliver ideas effectively and articulately | Ability to deliver ideas with great effect and articulate |
| | Understand and respond to question | Not able to understand and respond to a question | Able to understand and answer questions but not able to accurately answer the question | Able to understand and answer the questions satisfactorily | Able to respond to questions well | Able to fully understand and respond to questions very well |
| | Adapt delivery to audience level | Not able to deliver appropriately to the audience level | Able to deliver ideas with limited appropriateness to the target audience and require further improvements | Able to deliver ideas appropriately to the target audience satisfactorily | Able to deliver ideas appropriately to the target audience well | Able to fully deliver ideas appropriately very well. |
| CGPA | Academic achievement | 0.00 - 1.99<br>POOR | 2.00 - 2.49<br>UNSATISFACTORY | 2.50 - 2.99<br>SATISFACTORY | 3.00 - 3.49<br>VERY SATISFACTORY | 3.5 - 4.00<br>OUTSTANDING |

**Fig. 2** Rubric scoring template for input value

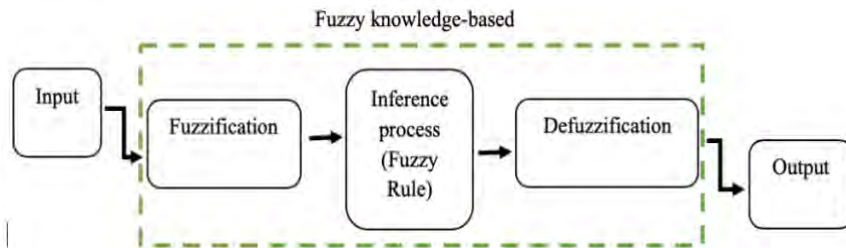Figure 3 illustrates the stages of fuzzy logic evaluation used in this study.



**Fig. 3** The stages of fuzzy logic evaluation

The proposed model I-SPE utilizes the fuzzy inference system (FIS). FIS is a knowledge-based or rule-based system that contains descriptive if-then rules created from human knowledge and experience (Kharola & Gupta, 2014). Figure 4 shows the "if-then rules" developed in this study.



**Fig. 4** If-then rules

If-then rules are used in the inference process for the decision-making of the output. This rule will determine the outcome of the study where it represents the decision-making and logical human judgement that are usually expressed in linguistic terms. The data gathered from the Rubric Scoring Template will go through a fuzzification process. Each parameter input will be classified and expressed in a linguistic expression, for instance unsatisfactory, satisfactory, and very satisfactory. Each linguistic expression will be grouped in the range interval as presented in Table 1.

**Table 1.** Linguistic expressions and intervals for input criteria

| Criteria | Linguistic expressions (Interval) | | |
|---|---|---|---|
| Leadership | Unsatisfactory (0, 0, 0.5) | Satisfactory (0.25, 0.5, 0.75) | Very Satisfactory (0.5, 1, 1) |
| Teamwork | Unsatisfactory (0, 0, 0.5) | Satisfactory (0.25, 0.5, 0.75) | Very Satisfactory (0.5, 1, 1) |
| Discipline | Unsatisfactory (0, 0, 0.5) | Satisfactory (0.25, 0.5, 0.75) | Very Satisfactory (0.5, 1, 1) |
| Communication | Unsatisfactory (0, 0, 0.5) | Satisfactory (0.25, 0.5, 0.75) | Very Satisfactory (0.5, 1, 1) |
| CGPA | Unsatisfactory (0, 0, 2) | Satisfactory (1, 2, 3) | Very Satisfactory (2, 4, 4) |

Table 2 represents the output for this study, which is the students' overall performance.

**Table 2.** Student's performance

| Linguistic expression | Interval |
|---|---|
| Poor | (0 0 0.25) |
| Average | (0 0.25 0.5) |
| Good | (0.25 0.5 0.75) |
| Very Good | (0.5 0.75 1) |
| Excellent | (0.75 1 1) |

The implementation of Fuzzy Logic approach in the evaluation of the students' performance is performed in MATLAB Fuzzy Logic Toolbox, as illustrated below. Figure 5 shows the setting up of the input and output of parameters in the system. Figure 5 depicts the computational experiments using MATLAB Fuzzy Logic Toolbox.
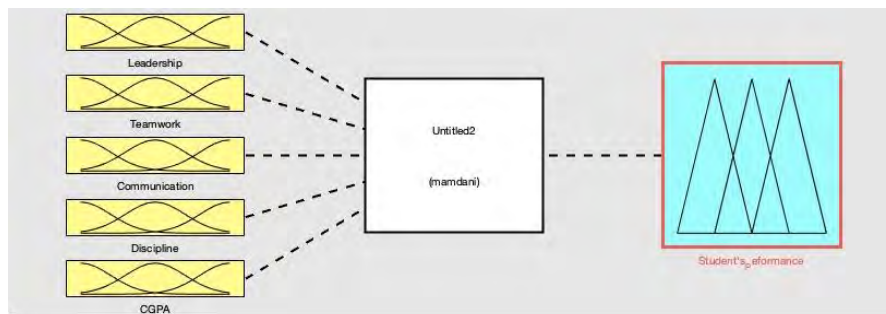


**Fig. 5** System analysis of input and output membership function

Figure 6 shows the membership function of input and output developed in the fuzzy logic system.
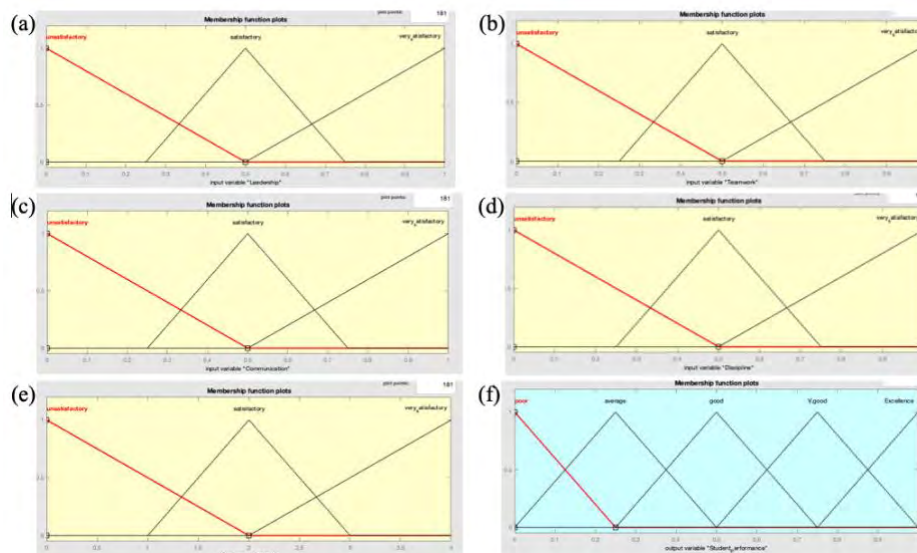


**Fig. 6** Membership functions of input and output variables
(a) Membership function for leadership
(b) Membership function for teamwork
(c) Membership function for communication
(d) Membership function for discipline
(e) Membership function for CGPA
(f) Membership function for students' competencies

### 3.    Result & Discussion

The proposed I-SPE model was tested on 20 students from all faculties in UiTM Mukah Campus using data collected from the leadership programme (PKPB) by considering five input parameters which include leadership, teamwork, communication, discipline and CGPA. The rubric scoring designed in this study assisted evaluators to assign marks for each student and the value was converted to be used as input value in Fuzzy Logic System as shown in Figure 7 below. Hence, the degree of membership will be shown in the output value.
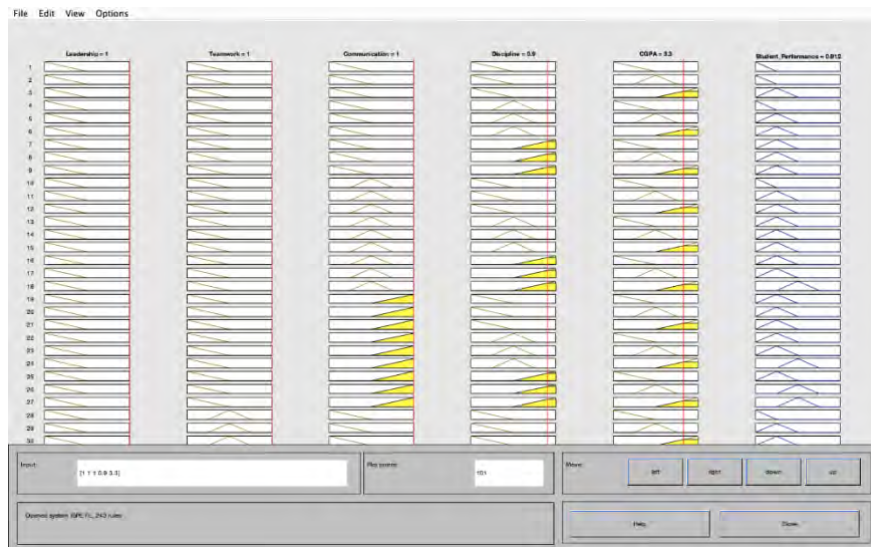


**Fig. 7** Input and output value

As a result, the highest output value obtained in this study was 0.912 which indicated that the student obtained the highest achievement and that value belonged to "excellence" in the membership function of the student's performance output. Based on the observation, the performance of this student was excellent, as he/she acquired high value for leadership skill, communication, teamwork and discipline. The degree of membership function did not achieve value 1 as the student did not achieve the highest CGPA. Nevertheless, he/she was still considered as a well-performed student academically. Although there were other students who obtained higher pointers in CGPA, they however, lack in terms of non-academic criteria. Meanwhile, the lowest value obtained among the 20 students evaluated was 0.324 that belonged to "Average" student performance rank. The results of student performance evaluation obtained using I-SPE that was based on Fuzzy Logic Approach was then compared to the results obtained using the current classical method practice. Interestingly, the present study revealed that the student selected using the proposed model, I-SPE was the same recipient of the Best Student Award when using the current practices. Therefore, this indicates that the outcome obtained using I-SPE for evaluating student performance is valid and reliable.

This finding shows that the usage of I-SPE in this study is able to mimic human logical sense, opinion and recommendation such as discussion in a meeting, which requires human judgement and also aids in deciding for the best recipient of the Best Student Award. Importantly, the proposed I-SPE developed in this study provides an ultimate advantage because it is more systematic, less time consuming and is able to generate quick results as compared to the conventional method. Furthermore, this finding is also parallel to the finding obtained in the study carried out by Gran et al (2019). Therefore, there will be no issues related to biases or favouritism as the outcome generated by I-SPE is apparently transparent and untenable. Based on the results obtained in this study, it can be seen that although there are many other students who scored better results academically, they were still unable to score the highest value using I-SPE. It could be due to the possibility that students do not have a balanced focus where they only put great effort to score well in academic over non-academic criteria. Most probably, this student only targets for high CGPA, but did not equip themselves with the required soft skills to make them qualified to be selected as the best student. The findings in this study clearly

showed that the I-SPE development does not emphasise merely on students' academic performance, but most importantly those who possessed great leadership skills which qualified the student to be the recipient of the Best Student Award. This appeared to be in contrast with the study done by Patil et al. (2012) which only focused on the application of fuzzy logic to evaluate the students' performance according to their academic performance that includes three criteria namely hard work, depth of knowledge and technical knowledge. Meanwhile, in real-life situations, students are required to possess other characteristics such as leadership and good soft skills. Moreover, most of the employers nowadays are not merely looking for potential employees with excellent academic backgrounds, but also skilful and competent ones. Recognizing this fact, this study suggests that granting the Best Student Award should be based on students overall performance by considering the academic performance and the soft skills as shown in the input in this study, namely leadership, teamwork, discipline, communication as well as the Cumulative Grade Point Average (CGPA). This is in line with the studies conducted by Tarmudi et al.(2015) for Pre-Diploma level students where the findings of their study highlighted the importance of evaluation of student performance based on both academic performance and soft skill for university recognition purposes. The findings from a study done by Abdullah et al (2012) also highlighted the importance of communication and leadership skills when evaluating student performance, similarly as stated in this study. Furthermore, studies conducted by Ismail et al. (2019) observed that although the traditional assessment method that mostly relied on test scores is effective in accessing the students' study skills competency, it appeared to be ineffective in providing more information on other important skills. Therefore, this study suggests that the output obtained in this study should measure the student's overall performance unlike the study done by Yadav et al. (2011), Barlybayev et al. (2016) and Aziz et al. (2019), where their findings only emphasized on student performance evaluation method which relied heavily on academic performance only. This study also revealed that by embedding rubric scoring designation into implementation of fuzzy logic approach, it is easier to assign students based on the range of classification provided, which is in line with the findings by Tay et al., (2009) that clearly stated the rubric as an essential scoring tool for subjectivity assessment.

## 4.      Conclusion

Qualitative evaluation involving assessment is usually subjective, which can lead to difficulties in opinion and thus, arising difficulties in terms of deciding students with better performance when there is a range of criteria involved in the evaluation. Based on the results of this study, the proposed model, I-SPE demonstrated its ability to overcome several difficulties faced by the evaluators. Moreover, it simplified the tasks of evaluators because they do not need to perform the complicated and time-consuming operation, compared to the current existing traditional method practices. Ultimately, the proposed systematic system is designed specifically to ensure fairness and transparency during the evaluation of student performance. Thus, any unfavourable and unethical conducts of evaluators such as biasness, favouritism, stereotype, unfairness and prejudice can be avoided. Dissatisfaction among students can be minimized because they know the process of selecting the best student is fair and transparent by using a system that is not merely based on human judgement. Thus, the objective of this study, which is to solve the issues of uncertainties faced by evaluators during the selection of the Best Student Award, is achieved. The development of I-SPE was proven to assist evaluators in providing an improved decision-making solution to the evaluators during the evaluation process. Also, the designation of rubric assessment has enhanced the efficiency of the implementation of fuzzy logic approach used in this study due to its clear description in assigning the value to be implemented as input value in the I-SPE development.

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