

DEVELOPMENT OF TEAM-BASED ELECTRONIC PORTFOLIO IN THE TEACHING & LEARNING OF ORDINARY DIFFERENTIAL EQUATIONS

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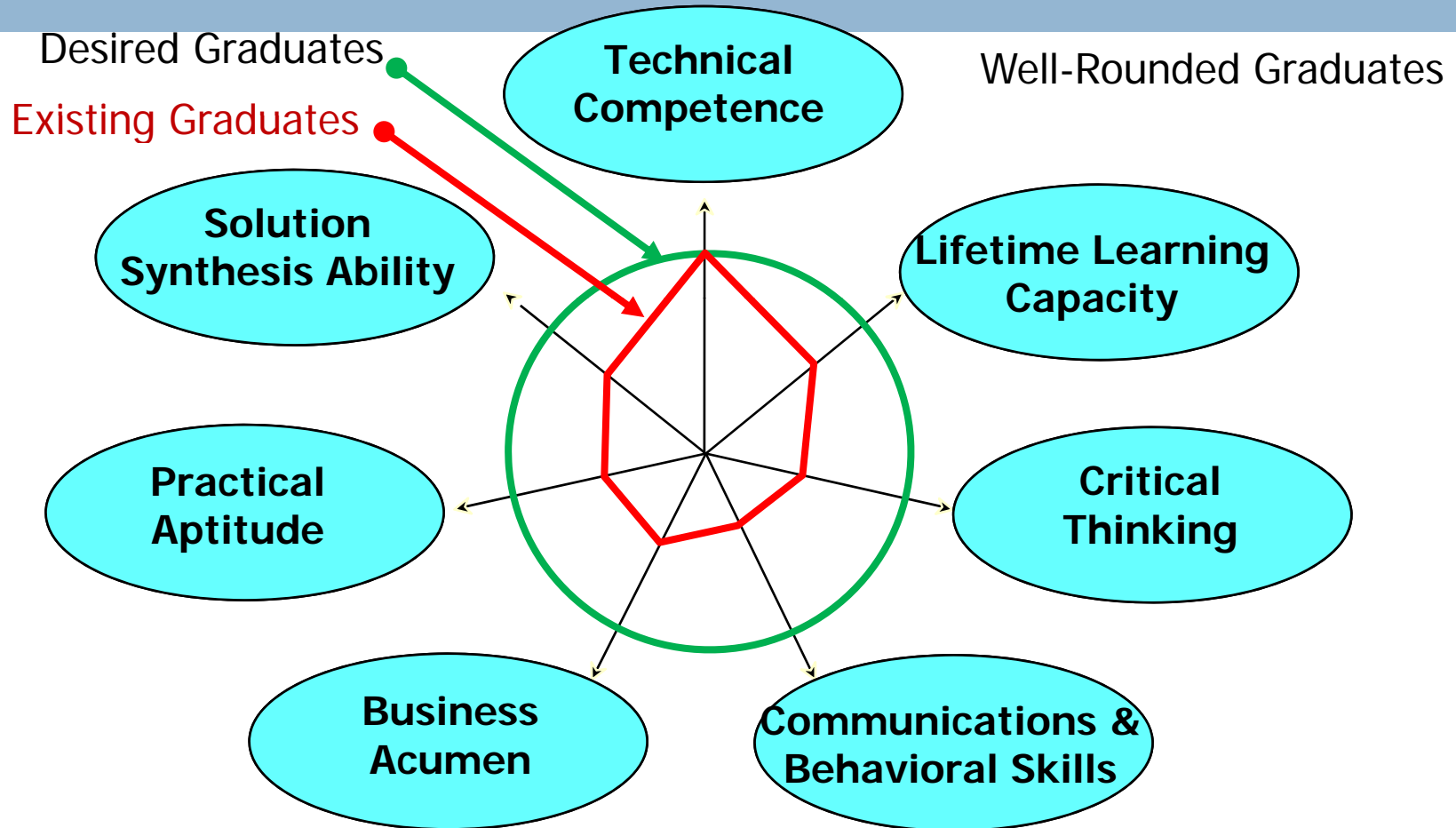
Introduction

- UTP focuses on engineering and technology programs
- multi national student population
- for a continual quality improvement - fulfilling the requirements of outcome-based education, EAC, meeting industrial needs and stakeholders' demands.

Introduction

Stakeholders' View:

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Stakeholders:

Government, Industry, Faculty, Academic Partners, Students, Universities

Top 10 qualities of a great engineer

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1. Possesses a strong analytical aptitude.
2. Shows an attention to detail,
3. Have excellent communication skills
4. Takes part in continuing education
5. Is creative
6. Shows an ability to think logically
7. Is mathematically inclined
8. Has good problem solving skills
9. Is a team player
10. Has excellent technical knowledge

(engineeringschools.com)

Assessment is an ongoing process that involves

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- planning
- discussion
- consensus building
- reflection
- measuring
- analyzing and
- improving

(Martell, K., & Calderon, T , 2005)

based on the data and artifacts gathered about a learning objective.

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Problem statement

What type of assessment methods are installed to measure students' learning in preparation for such well-balanced graduates?

Objectives

To discover participants' feedback and rating towards the e-portfolio assessment in the teaching and learning of the Differential Equations course.

Literature review

- Limitations of traditional assessment methods.
- Alternative assessments include the learning portfolio.
- Used in nursing, 29 participants, effective tool for documenting achievement of program objectives
- Computer Education and Instructional Technology,
- 109 UTP engineering students doing Calculus in foundation used paper-based learning portfolio, not only assist them in learning but also promotes organization and discipline within themselves

Definition of learning portfolio

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- A purposeful collection of student work that exhibits the student's efforts, progress and achievements in one or more areas.
- Must include student participation in selecting the contents, the criteria for selection, the criteria for judging merit and evidence of student self-reflection
- 77 percent of the variations in attitude toward the course were the instructor, course topic, course execution, and the room (physical environment).
- More than a 'folder of student work; it is a deliberate specific collection of accomplishments
- A formative assessment wherein students become active learners and questioning thinkers.
- Collection of learner's work that demonstrates achievement or improvement
- Definition depends on its purpose and objectives.
- This research, named e-DELP is a team-based electronic portfolio and it is aimed at measuring students' learning abilities in applying their knowledge, aptitude and attitude while organizing, assembling, presenting, communicating, utilizing multi-media, and working in a team.

Methodology

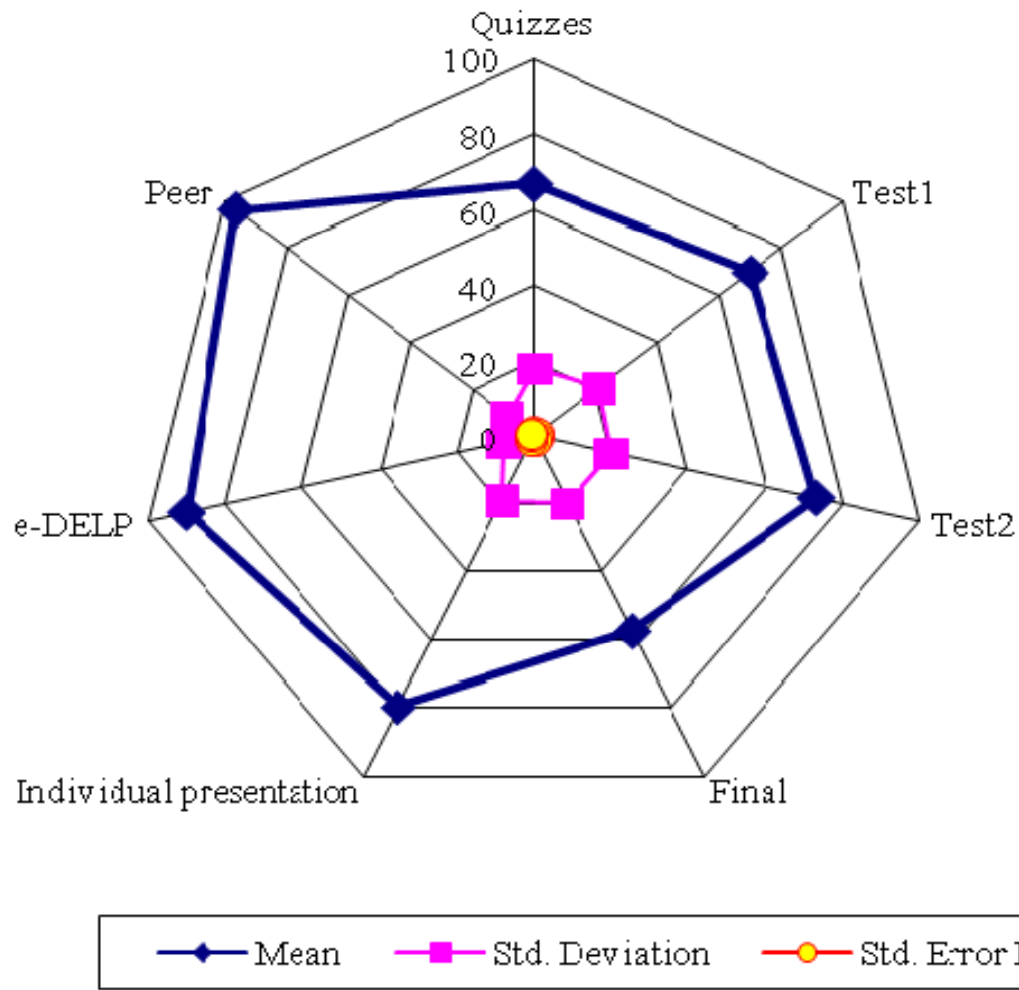
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- Research Design is ex pos facto, formation of group not manipulated
- 242 participants, engineering discipline, first semester
- Pretest, posttest, 7 weeks time frame for e-DELP
- Written tests, final exam, 5 modeling problems involving first order ODE integrated in team-based e-DELP, peer assessment, individual interview, e-DELP rating.
- UTP Grading system for written tests
- Instructions, scoring rubrics quantified for evaluation of alternative assessments posted on e-learning

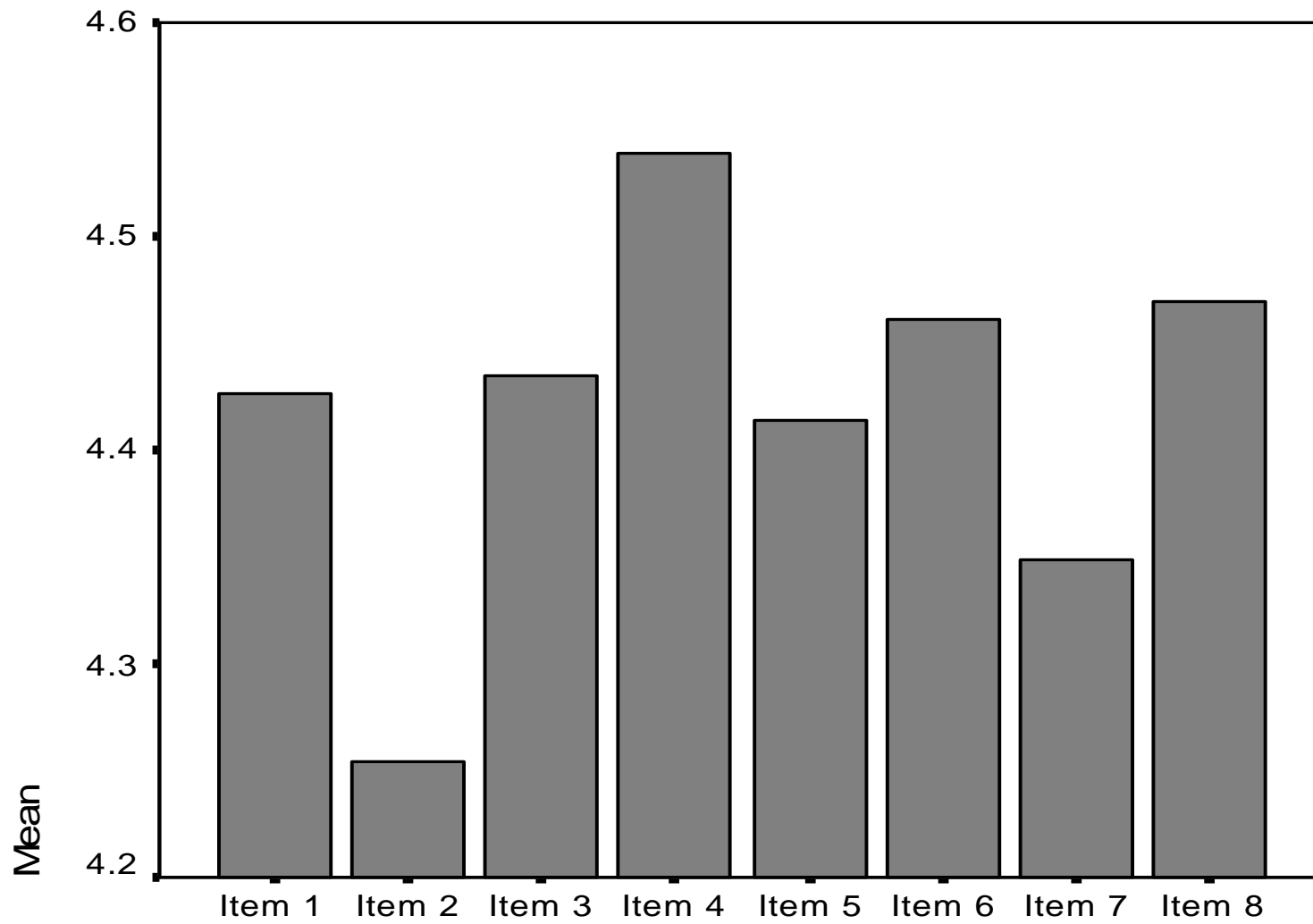
RESULTS & DISCUSSION

Tests	Number of Participants	Mean	Standard Deviation	Standard Error Mean
Pretest	128	1.3750/10	2.53790	0.22432
Posttest	128	7.1563/10	3.19802	0.28267

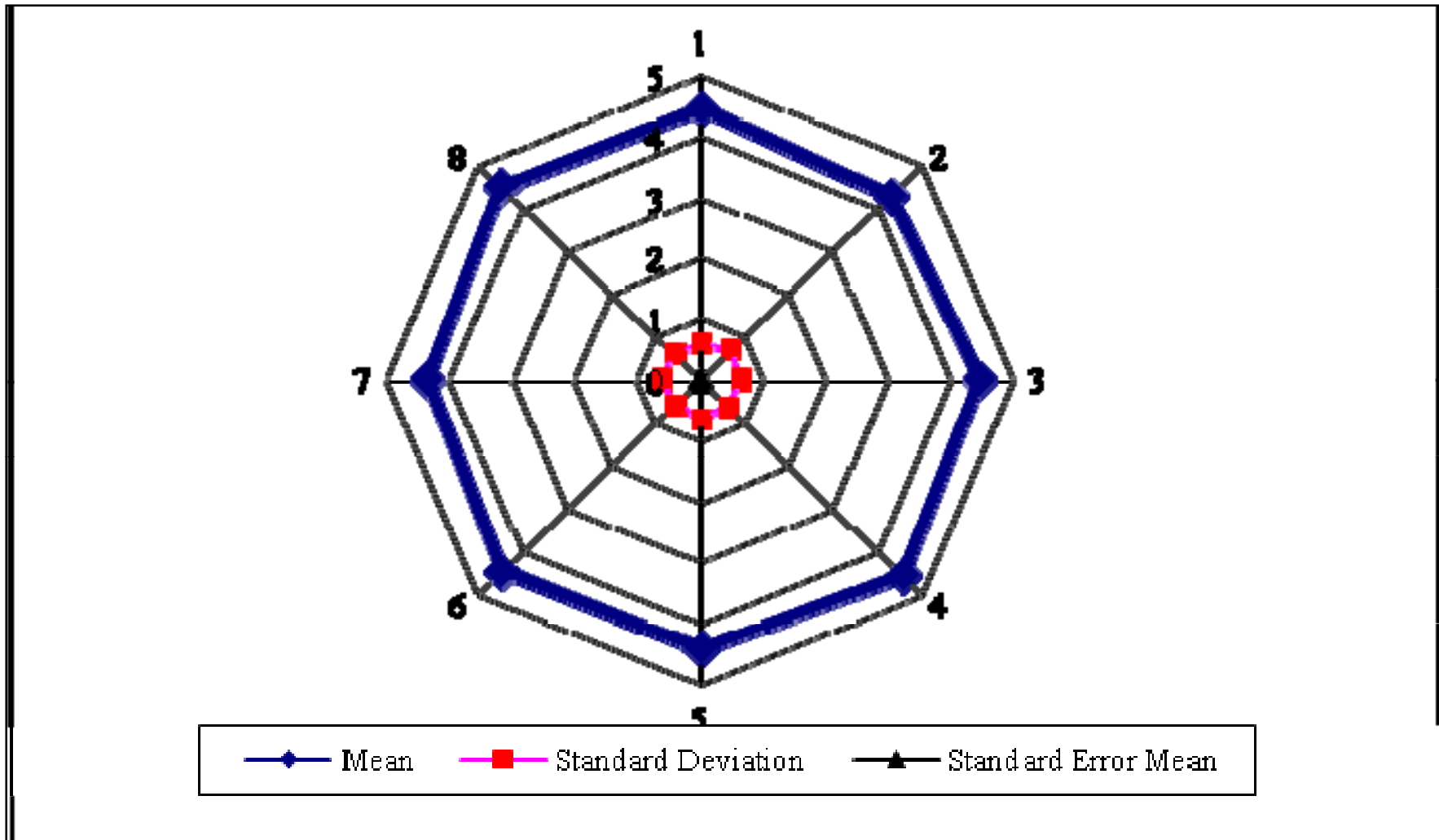
STATISTICS OF THE PRE AND POSTTESTS



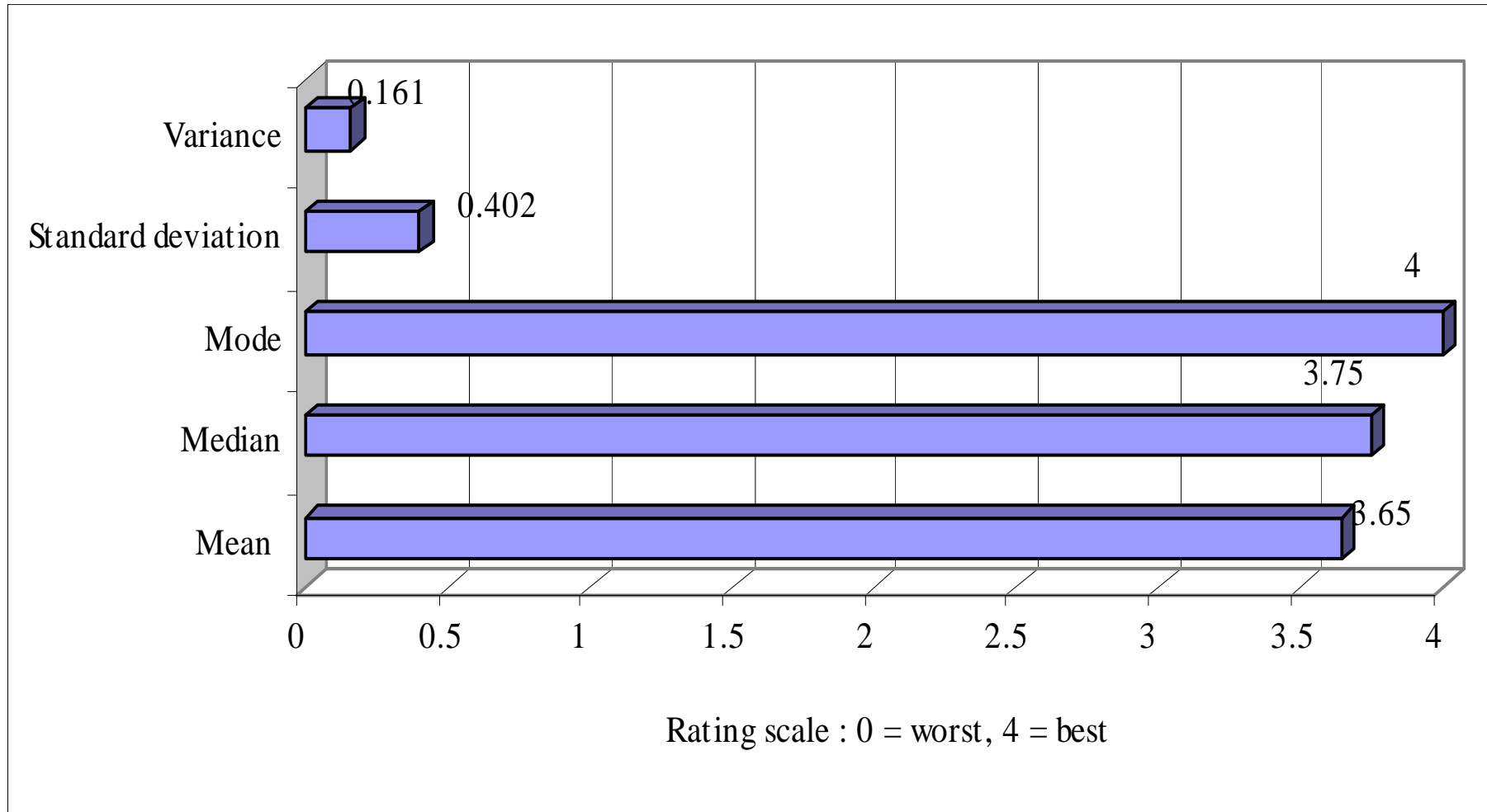
STATISTICAL REPRESENTATION OF SCORES



Column representation of participants' responses to questionnaire



PARTICIPANTS' RESPONSES TO THE 8-ITEM QUESTIONNAIRE



BAR CHART REPRESENTATION OF E-DELP RATING BY PARTICIPANTS

Reflections

- Doing this portfolio have been quite beneficial for us all since the problems brush up our problem solving skills in mathematics and algebra equations. Besides, we can improve our computer skills in Microsoft power-point as it will be very useful for our presentations in future.
- This portfolio has definitely brought us to a better and deeper understanding of this subject. Differential equations is like the core subject for engineering students. This is because we use it in solving real life problems in the engineering field.!

Reflections ctd...

- Is doing this portfolio beneficial to us? Definitely yes! By doing this portfolio, we can help each other in solving the question. Those questions are very helpful as they make us think and find ways to solve them. If we could not solve a question on our own, we still have other members who might be able to assist us. Besides, we also make new friends through this portfolio. We are grouped randomly by our lecturer so that we will not only stick with our own clique. A group of five members who belong to different sex, religion and races make us understand our nation better.
- We realize that e-portfolio of Differential Equation is a very beneficial and informative course because It does help us during our study. The questions that had been given needs us to think out of the box as they are application problems which requires further understanding of a concept.

Reflections ctd...

- The assignment was an instant eye opener. From here, we understood how to apply it in our daily lives, with some help that came from other application books on various ways to apply DE in daily life. The five sections given gave a clear view on why we are learning this subject as a whole.
- By doing the e-portfolio, we get an overview of how the differential equations can be used in real life situation.
- Doing e-portfolio is indeed beneficial to us because we learn how to solve the problem by using the correct method and formula.

Conclusion

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1. Positive attitude towards the e-DELP.
2. Realized the reasons for doing the Differential Equations.
3. Peer evaluation indicated high collaborative work preference.
4. Discipline in meeting the deadline, good for the future working life as engineers.
5. E-DELP was well received and accepted with contentment amongst the participants.
6. Significant improvement in solving the modeling problems also signifies effective learning process took place.
7. High peer assessment scores indicate strong teamwork within the groups and this had influenced their attitude towards the e-DELP development.
8. Limitations of this research - done on UTP campus, a Malaysian private university, involving only first semester engineering undergraduates.
9. Scope of study can be extended to other local private and public universities involving engineering undergraduates of more advanced semesters.



Thank you