The Empirical Study on Alternative Assessment of Portfolio Based on Saaty's Analytic Hierarchy Process (AHP)

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Abstract

Purpose - Digital knowledge has been recognised as an indispensable asset in today's world. As an educator, how can we help students to acquire the 21st century skills? Digital learning technology plays an important role in the assessment. A variety of assessment formats has been recommended to engage and motivate students' learning. Portfolio / e-portfolio has been recommended by many studies (UNSW, 2019; Kampylis, Punie& Devine, 2015; McDonald, 2011) as one of the effective ways to document and communicate students' learning process. However, the portfolio is a very subjective form of assessment. This paper attempts to conduct an empirical study on alternative assessment of portfolio based on Saaty'sAnalytic Hierarchy Process (AHP). The assessment framework called "3AHP" is established against the course learning outcomes (CLOs).

Approach - Two sets of portfolios submitted by undergraduate students for two different courses applying for course exemption through Accreditation of Prior Experiential Learning (APEL) were assessed respectively by both the traditional way of rating scales with rubrics and 3AHP. A comparison of both rating scale assessment versus 3AHP is discussed. Assessment criteria for both rating scales and 3AHP are discussed.

Findings - Results of this study indicate that both rating scales and 3AHP generate similar assessment results.

Implications - 3AHP assessment approach simplifies the portfolio assessment processes. In addition, 3AHP approach standardizes and minimizes the variation in portfolio assessment among different assessors. 3AHP assessment approach is generic in nature. It can be applied to assess the portfolio of formal, informal and non-formal learning. It can also be implemented in different disciplines and to simplify the task of assessors at institutions of higher learning.

Key words: portfolio, Analytic Hierarchy Process (AHP), assessment.

1. Introduction

In today's world, digital knowledge has been recognised as an indispensable asset. As an educator, how can we help students to acquire the 21st century skills? The answer lies on effective teaching and teacher effectiveness. According to Ko, Sammons and Bakkum (2014),

teacher effectiveness is very much related to the focus on student outcomes, the teacher behaviours and classroom processes that promote better student outcomes. However, this can be complex and controversial. Nevertheless, student outcomes are emphasized.

To achieve the students' learning outcomes, a variety of assessment formats such as performance-based assessment, portfolio-based assessment, project-based learning, etc. have been recommended to engage and motivate students' learning. Not to forget that digital learning technology also plays an important role in the assessment.

Assessment using portfolios has recently gained wider acceptance (Joshi, Gupta and Singh, 2015). Many studies (UNSW, 2019; Kampylis, Punie & Devine, 2015; McDonald, 2011) recommended portfolio / e-portfolio as one of the effective ways to document and communicate students' learning process, as well as an alternative and effective way in assessing students' outcomes.

However, the portfolio is a very subjective form of assessment. To conduct portfolio assessment requires thorough preparation and planning in advance. It is also not easy to transform portfolio assessments into a single score or grade (Gomaz, 2000)

This paper attempts to adopt a qualitative approach to conduct an empirical study on an alternative assessment of portfolio based on Saaty's Analytic Hierarchy Process (AHP). The assessment framework called "3AHP" is established against the course learning outcomes (CLOs).

2. Related Studies

2.1 Traditional Assessment Methods

Traditionally, to assess a student's work or performance was solely relied on standardized tests, unit tests and quizzes. Over the years, it was noted that standardize testing and assessment process took away all equality of students. A student under such education system may be deemed as "lower-level" simply because he /she is unable to read by a certain age, or unable to perform simply from a low reading score (Ashleytipton, n.d.).

Many educators believed that students cannot be assessed solely by written exams or in the form of objective tests. This assessment method is not really a valid test to determine students' achievements because it only focuses on students' cognitive domain and has less capacity to assess students' affective and psychometric domains (Afrianto, 2008).

According to Linda Darling-Hammond, "the tests generally do not reflect the actual tasks educators and citizens expect students to be able to perform, nor do they stimulate forms of instruction that are closely connected to development of performance abilities" (1994).

This traditional assessment approach mostly promotes students to memorize rules or algorithms rather than conceptual understanding, and focus on small, discrete components of

the domain (Dochy, 2001). In addition, Birgin & Baki (2007) commented that these assessment methods did not reveal the true picture about students' understanding and learning. They were not enough to assess higher order cognitive skills such as problem solving, critical thinking and reasoning (Romberg, 1993), not measuring a students' ability to organize relevant information (Shepard, 1989), and assessed what is easy to test-memorization of rote skills and procedures (Mumme, 1991).

2.2 Portfolio

The definition of Portfolio comes from Italian word **"***portare"* – means to carry and "*foglio"* meanssheet/ sheet of paper. It is referred to "*A purposeful collection of student work that exhibits the student's efforts, progress and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit and evidence of student self-reflection.*" (Paulson, Paulson & Meyer, 1991)

Besides being a compilation of student work meant to show growth over time, portfolio is also considered as a collection or samplings of information relating to each student's developmental progress in an educational setting. In another word, portfolio assesses both learning process and learning product.

"*As a product, it holds the work records and documents a learner has produced during a course or program, and represents an edited collection of their learning achievements. As a process-oriented tool, it enables learners to monitor their own learning systematically, by reflecting upon their learning experience*" (Teaching @UNSW, 2017).

Portfolio provides students with varied opportunities to show their learning progress. It is not giving all students the same test, it allows students to complete different assessments based on their interests, in order to best measure how they learn and how much they have learned. It also help to determine whether the student is to remain on the current track or should be moved to a lower or higher track.

Many disciplines now use portfolio to support integrative learning (Teaching @UNSW, 2017). Portfolio has the potential to be a valuable tool for programme assessment as well (Sewell, Marczak, & Horn, n.d).

With the development of technology and social change, portfolios are now not only developed in hard copy but also in digital form, i.e. e-portfolio (Cheng & Siow, 2018).

2.3 Portfolio-based Assessment

Portfolio-based assessment has been recommended as an alternative and effective way in assessing students' outcomes (UNSW, 2019).

Gomez (2000, p.1) proposed that "*portfolio assessments as systematic collection of students work measured against predetermined criteria. These criteria may include scoring guides, rubrics, checklists, or rating scales*". The contents of portfolios are scored using specific

criteria, the use of assessment portfolios is thus considered as criterion-referenced assessment.

Portfolio-based assessments "*provide[s] a means for those students at risk for academic failure to demonstrate progress within a format less restrictive and inflexible than the traditional means…lead to individualization and equality*" (Ashleytipton, n.d., paragraph 3).

Thomas, et al (2004) commented that portfolio-based assessments not only individualized student education, but they also sought to help teachers better their instruction. "*If teachers are teaching to a test year after year, their instruction will eventually become rote memorization and standardized itself. However, if teachers are teaching to assess their students with a portfolio, requiring students to have many various types of work to demonstrate their understanding, in turn requiring teachers to teach using various methods leading to performance tests."* (Ashleytipton, n.d., paragraph 3).

2.4 Challenges of Portfolio Assessment Implementation

In spite of the fact that portfolio assessments have advantages over the traditional methods, it is not easy to implement it in the education institutions, be it higher education or schools. Resistance, non-completion and difficulties with evaluating the portfolio and assessing the evidence are the problems encountered (Tisani, 2008). Ashleytipton (n.d.) supported that resentment and standardization are the two main challenges. These are largely due to the fact that portfolio construction is more than the procedure of putting documents and artefacts together.

Besides, portfolio assessment is perceived by teachers as an "add-on" tasks rather than an assessment by itself. Teachers wonder why they should have to assess students work if a standardized test can do the same thing in one single day. Secondly, different teachers / assessors may result in different grading of the portfolio, due to the fact that it is too subjective (Afrianto, 2017). It is also difficult to prove that all students' portfolio are correctly graded (Gomaz, 2000).

Low comparability and reliability is another challenge in implementing the portfolio assessment. It is not easy to transform portfolios into a single score or grade. The fact is that public used to see a single score as the one in the standardized tests (Gomez, 2000).

In addition, Gomaz (2000) also pointed out that high cost is another possible problem. It is because portfolio assessment takes a great effort to designing, implementing, and scoring portfolio items which is a hard job and costly, estimated to be three to ten times higher than using multiple-choice tests according to a report by Rand Corporation (Stecher & Klein, 1997 in Gomez, 2000). Educators have to provide a significant amount of time to suit the assessment tasks with curriculum and develop the scoring criteria and scoring tools.

3. An Innovative and Reliable Approach

3.1 The 3AHP Framework

Academic Enhancement and Leadership Development Centre (ADeC), University of Malaya and Ministry of Education, Malaysia recommended eight principles on portfolio-based assessment (Ghaffar & Yusop, 2018). They are listed as follows, the details are attached at Appendix.

Principle #1: Learning Outcomes
Principle #2: Digital Environments
Principle #3: Virtual Identities
Principle #4: Authentic Audiences
Principle #5: Reflection and E-portfolio Pedagogy
Principle #6: Integration and Curriculum
Principle #7: Stakeholders' Responsibilities
Principle # 8: Lifelong Learning

Traditionally, rubrics, weightage and scores are used to assess portfolio. In addition, as mentioned in Section 2.4, it is not easy to create specific rubrics, and time-consuming too. Each course will also require a different set of specific rubrics. How to justify the weightage of each rubric is another hassle. Furthermore, there is no standard method in assessing portfolio currently.

This study adopted the above mentioned Principle #1 Learning Outcomes and modelling the Analytic Hierarchy Process (AHP)'s nine-point scale pairwise comparison matrix developed by Thomas L. Saaty's (1980 & 1990). AHP has been extensively studied and refined (Mathivathanan, Govindan, & Haq (2017), Deng (2017), Mir& Padma (2017)).

AHP is a decision making tool based on Mathematics and Psychology. Relating elements to overall goals, AHP provides a rational framework and helps decision makers find the best decision which suits their goals (Cheng & Siow, 2018).

The pairwise comparison matrix of AHP is a standard nine-point scale indicating the scale value by relating one factor to another in considering their importance, thus helping quick but reliable decisions in making the choice. (Saaty, 1980).

Adapting from the AHP's nine-point scale pairwise comparison matrix, the portfolio which may consist of only one or combination of formal, informal and non-formal learning is considered as one factor while the benchmark against the Course Learning Outcomes (CLOs), the other factor, a ten-point scale is developed to help the Assessor to evaluate the degree of similarity and accuracy of portfolio to the CLOs (Cheng & Siow, 2018). Following Table 1 is the proposed framework to be used for assessment of portfolio, where the framework is named as "3AHP Framework".

Table 1 3AHP Framework

Saaty's pairwise comparison matrix :		Proposed Portfolio Assessment			
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	**NONE**	0%	**F**
1	i is as important as j	1	**CLOSE**	20%	**E**
3	i is moderately more important than j	3	**SIMILAR**	40%	**D**
5	i is strongly more important than j	5	**ALIKE**	60%	**C**
7	i is very strongly more important than j	7	**SAME**	80%	**B**
9	i is extremely more important than j	9	**EXACTLY**	100%	**A**

Note : Where i and j are two different factors. E.g. Student's Portfolio (i) and the Course Learning Outcomes (CLOj) in this study. Scale values 2, 4, 6 and 8 lie midway between the definitions for their nearest values given above.

To have a standardized and fair way to assess the student's portfolio. This helps to minimize the variations in assessments of portfolios among different institutions of higher education of learning.

3.2 The Study

In pursuance of the development of Malaysia Qualification Agency (MQA) on Accreditation of Prior Experiential Learning (APEL), portfolio developed from the informal and non-formal learning had been taken into the consideration for university admission and credit transfer.

Two courses were taken from the Bachelor degree of Business Administration namely Record Management (MRM502) and Business Communication (MCM504). The Programme Learning Objectives (PLOs) are stated in Table 2:

Table 2 :Programme Learning Objectives

PLO1	To evaluate theories and concepts in business studies
PLO2	To communicate creative and innovative ideas effectively.
PLO3	To apply critical thinking skills for decision making.
PLO4	To display innovative entrepreneurship skills.
PLO5	To demonstrate leadership, teamwork, communication and social skills in accordance with ethical and legal practices.
PLO6	To apply the skills and principles of life-long learning in their academic and career development.

The Course Learning Outcomes (CLOs) for the Subject MRM504 Record Management are listed in Table 3.

Table 3 : Course Learning Outcomes (CLOs) for Record Management (MRM504)

CLO 1	Demonstrate the understanding of the theory, methods, and practices of records management
CLO 2	Appraise several filing systems
CLO 3	Apply various codes of practices for record management

Rubrics (Table 4) were established as per traditional way of assessment on Record Management (MRM502)

Table 4 : Rubrics of Assessment for Record Management (MRM502)

No.	Statement of Outcomes	Scale						Score	Total
		0	1	2	3	4	5		
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO 1	Demonstrate the understanding of the theory, methods, and practices of records management	Not shown	Able to list methods in Record Management and list their applications in current practices	Able to explain methods in Record Management and identify their application in current practices.	Able to explain methods in Record Management and describe briefly their applications in current practices.	Able to explain the theories and methods in Record Management and also describe briefly their applications in current practices.	Able to explain in details the theories and methods in Record Management and also describe their applications in current practices with several examples		
CLO1 (Score)									
CLO2	Appraise several filing systems	Unable to name any filing system	Able to name two filing system and explain them briefly.	Able to describe two filing systems. List the advantages and disadvantages of each system.	Able to describe two filing systems. Elaborate the advantages and disadvantages of each system with some examples.	Able to describe several filing systems. Explain the advantages and disadvantages of each system.	Able to describe several filing systems in details. Elaborate the advantages and disadvantages of each system with some examples.		
CLO2 (Score)									
CLO3	Apply various codes of practices for record management	Unable to name any code of practice for Record Management	Able to name one code of practice for Record Management and explain it briefly	Able to name one code of practice for Record Management and elaborate their applications.	Able to name one code of practice for Record Management and elaborate their applications with some examples	Able to describe several codes of practices for Record Management and explain their applications.	Able to describe several codes of practices for Record Management and explain their applications with some examples.		
CLO3 (Score)									

3AHP framework (Table 5) is established in assessing the portfolio:

Table 5 : 3AHP Framework for Record Management (MRM502)

Saaty's pairwise comparison matrix :		Proposed Portfolio Assessment			
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	Student's portfolio is NONE like CLO1	0%	**F**
1	i is as important as j	1	Student's portfolio is as CLOSE as CLO1	20%	**E**
3	i is moderately more important than j	3	Student's portfolio is SIMILAR to CLO1	40%	**D**
5	i is strongly more important than j	5	Student's portfolio is ALIKE to CLO1	60%	**C**
7	i is very strongly more important than j	7	Student's portfolio is the SAME as CLO1	80%	**B**
9	i is extremely more important than j	9	Student's portfolio is EXACTLY like CLO1	100%	**A**
Saaty's pairwise comparison matrix :		Proposed Portfolio Assessment			
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	Student's portfolio is NONE like CLO2	0%	**F**
1	i is as important as j	1	Student's portfolio is as CLOSE as CLO2	20%	**E**
3	i is moderately more important than j	3	Student's portfolio is SIMILAR to CLO2	40%	**D**
5	i is strongly more important than j	5	Student's portfolio is ALIKE to CLO2	60%	**C**
7	i is very strongly more important than j	7	Student's portfolio is the SAME as CLO2	80%	**B**
9	i is extremely more important than j	9	Student's portfolio is EXACTLY like CLO2	100%	**A**
Saaty's pairwise comparison matrix :		Proposed Portfolio Assessment			
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	Student's portfolio is NONE like CLO3	0%	**F**
1	i is as important as j	1	Student's portfolio is as CLOSE as CLO3	20%	**E**
3	i is moderately more important than j	3	Student's portfolio is SIMILAR to CLO3	40%	**D**
5	i is strongly more important than j	5	Student's portfolio is ALIKE to CLO3	60%	**C**
7	i is very strongly more important than j	7	Student's portfolio is the SAME as CLO3	80%	**B**
9	i is extremely more important than j	9	Student's portfolio is EXACTLY like CLO3	100%	**A**

Note :Where i=student's portfolio and j = Course Learning Outcomes (CLOj)

The score of the student's portfolio on CLO1 Record Management (MRM502) is depicted at Table 6.

Table 6 : Score of Student's Portfolio on CLOs of Record Management (MRM502)

No.	Statement of Outcomes	Scale						Score	Total
		0	1	2	3	4	5		
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO 1	Demonstrate the understanding of the theory, methods, and practices of records management	Not shown	Able to list methods in Record Management and list their applications in current practices	Able to explain methods in Record Management and identify their application in current practices.	Able to explain methods in Record Management and describe briefly their applications in current practices.	Able to explain the theories and methods in Record Management and also describe briefly their applications in current practices.	Able to explain in details the theories and methods in Record Management and also describe their applications in current practices with several examples	4	80%
CLO1 (Score)								4	80%

No.	Statement of Outcomes	Scale						Score	Total
		0	1	2	3	4	5		
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO2	Appraise several filing systems	Unable to name any filing system	Able to name two filing system and explain them briefly.	Able to describe two filing systems. List the advantages and disadvantages of each system.	Able to describe two filing systems. Elaborate the advantages and disadvantages of each system with some examples.	Able to describe several filing systems. Explain the advantages and disadvantages of each system.	Able to describe several filing systems in details. Elaborate the advantages and disadvantages of each system with some examples.	4	80%
CLO2 (Score)								4	80%

No.	Statement of Outcomes	Scale						Score	Total
		0	1	2	3	4	5		
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO3	Apply various codes of practices for record management	Unable to name any code of practice for Record Managemen t	Able to name one code of practice for Record Management and explain it briefly	Able to name one code of practice for Record Management and elaborate their applications.	Able to name one code of practice for Record Management and elaborate their applications with some examples	Able to describe several codes of practices for Record Management and explain their applications.	Able to describe several codes of practices for Record Management and explain their applications with some examples.	3	60%
CLO3 (Score)								3	60%

Course Learning Outcomes (CLOs) for Business Communication (MBC502) is depicted at Table 7.

Table 7 : Course Learning Outcomes (CLOs) for Business Communication (MBC502)

CLO 1	Explain the concept of interpersonal communication, its elements and its relation to cultural aspects.
CLO 2	Apply communication skills as a result of the exposure to various communication modes and techniques such as public speaking, and writing.
CLO 3	Appraise the etiquette and ethics in communication.
CLO 4	Evaluate the impact of the Internet in communication.

Rubrics (Table 8) were established as per traditional way of assessment on Business Communication (MCM504)

Table 8 : Rubrics for Assessment of Portfolio of Business Communication (MCM504)

Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	**Scale**							
		0	1	2	3	4	5	**Score**	**Total**
		None	Poor	Fair	Average	Good	Excellent	**Portfolio**	
CLO 1	Explain the concept of interpersonal communication, its elements and its relation to cultural aspects.	Unable to explain any concept of interpersonal communication.	Able to state a few concept of international communication and its relations to cultural aspects.	Able to explain the concept of interpersonal communication, its elements and relationship with culture.	Able to explain the concept of interpersonal communication and also able to relate its elements with cultural aspects.	Able to explain the concept of interpersonal communication in details, explain its elements and relation to cultural aspects.	Able to explain the concept of interpersonal communication in details , explain its elements and relation to cultural aspects, with examples		
Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	**Scale**							
		0	1	2	3	4	5	**Score**	**Total**
		None	Poor	Fair	Average	Good	Excellent	**Portfolio**	
CLO 2	Apply communication skills as a result of the exposure to various communication modes and techniques such as public speaking, and writing.	Unable to apply any communication modes or technique.	Able to apply limited communication modes and techniques	Able to apply a few communication modes and technique	Able to apply communication skills through some of the communication modes and techniques.	Able to apply communication skills with some level of engagement.	Able to apply communication skills with elaboration and connection.		
Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	**Scale**							
		0	1	2	3	4	5	**Score**	**Total**
		None	Poor	Fair	Average	Good	Excellent	**Portfolio**	
CLO 3	Appraise the etiquette and ethics in communication.	Unable to appraise the etiquette and ethics in communication.	Able to appraise few basic etiquette and ethics in communication.	Able to appraise a few basic etiquette and ethics in communication.	Able to appraise the important etiquette and ethics in communication.	Able to appraise the important etiquette and ethics in communication and able to demonstrate with few examples.	Able to appraise the important etiquette and ethics in communication and relate to current practices.		
Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	**Scale**							
		0	1	2	3	4	5	**Score**	**Total**
		None	Poor	Fair	Average	Good	Excellent	**Portfolio**	
CLO 4	Evaluate the impact of the Internet in communication.	Unable to evaluate the impact of internet in communication.	Able to name some issues of internet in communication.	Able to describe some issues of internet in communication.	Able to evaluate some impact of the internet in communication.	Able to evaluate the impacts of internet in communication few examples.	Able to evaluate the impacts of internet in communication and relate them to current practices.		

The 3AHP Framework (Table 9) is established for Subject Business Communication (MCM504).

Table 9 : 3AHP Framework (Table 9) for Business Communication (MCM504)

Saaty's pairwise comparison matrix :		Proposed Portfolio Assessment			
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	Student's portfolio is NONE like CLO1	0%	F
1	i is as important as j	1	Student's portfolio is as CLOSE as CLO3	20%	E
3	i is moderately more important than j	3	Student's portfolio is SIMILAR to CLO1	40%	D
5	i is strongly more important than j	5	Student's portfolio is ALIKE to CLO1	60%	C
7	i is very strongly more important than j	7	Student's portfolio is the SAME as CLO1	80%	B
9	i is extremely more important than j	9	Student's portfolio is EXACTLY like CLO1	100%	A
Saaty's pairwise comparison matrix :		Proposed Portfolio Assessment			
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	Student's portfolio is NONE like CLO2	0%	F
1	i is as important as j	1	Student's portfolio is as CLOSE as CLO2	20%	E
3	i is moderately more important than j	3	Student's portfolio is SIMILAR to CLO2	40%	D
5	i is strongly more important than j	5	Student's portfolio is ALIKE to CLO2	60%	C
7	i is very strongly more important than j	7	Student's portfolio is the SAME as CLO2	80%	B
9	i is extremely more important than j	9	Student's portfolio is EXACTLY like CLO2	100%	A
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	Student's portfolio is NONE like CLO3	0%	F
1	i is as important as j	1	Student's portfolio is as CLOSE as CLO3	20%	E
3	i is moderately more important than j	3	Student's portfolio is SIMILAR to CLO3	40%	D
5	i is strongly more important than j	5	Student's portfolio is ALIKE to CLO3	60%	C
7	i is very strongly more important than j	7	Student's portfolio is the SAME as CLO3	80%	B
9	i is extremely more important than j	9	Student's portfolio is EXACTLY like CLO3	100%	A
Scale value Sij relating i to j	Meaning	Scale value Sij relating i to j	Meaning	Quantum of similarity to CLOs	Grading
		0	Student's portfolio is NONE like CLO4	0%	F
1	i is as important as j	1	Student's portfolio is as CLOSE as CLO4	20%	E
3	i is moderately more important than j	3	Student's portfolio is SIMILAR to CLO4	40%	D
5	i is strongly more important than j	5	Student's portfolio is ALIKE to CLO4	60%	C
7	i is very strongly more important than j	7	Student's portfolio is the SAME as CLO4	80%	B
9	i is extremely more important than j	9	Student's portfolio is EXACTLY like CLO4	100%	A

The Score of the Student's Portfolio on CLOs Business Communication (MBC504) is depicted at Table 10.

Table 10 : The Score of the Student's Portfolio on CLOs Business Communication (MBC504)

Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	Scale							
		0	1	2	3	4	5	Score	Total
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO 1	Explain the concept of interpersonal communication, its elements and its relation to cultural aspects.	Unable to explain any concept of interpersonal communication.	Able to state a few concept of international communication and its relations to cultural aspects.	Able to explain the concept of interpersonal communication, its elements and relationship with culture.	Able to explain the concept of interpersonal communication and also able to relate its elements with cultural aspects.	Able to explain the concept of interpersonal communication in details, explain its elements and relation to cultural aspects.	Able to explain the concept of interpersonal communication in details , explain its elements and relation to cultural aspects, with examples	3	60%

Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	Scale							
		0	1	2	3	4	5	Score	Total
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO 2	Apply communication skills as a result of the exposure to various communication modes and techniques such as public speaking, and writing.	Unable to apply any communication modes or technique.	Able to apply limited communication modes and techniques	Able to apply a few communication modes and technique	Able to apply communication skills through some of the communication modes and techniques.	Able to apply communication skills with some level of engagement.	Able to apply communication skills with elaboration and connection.	3	60%

Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	Scale							
		0	1	2	3	4	5	Score	Total
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO 3	Appraise the etiquette and ethics in communication.	Unable to appraise the etiquette and ethics in communication.	Able to appraise few basic etiquette and ethics in communication.	Able to appraise a few basic etiquette and ethics in communication.	Able to appraise the important etiquette and ethics in communication.	Able to appraise the important etiquette and ethics in communication and able to demonstrate with few examples.	Able to appraise the important etiquette and ethics in communication and relate to current practices.	3	60%

Course Name : MBC502 Business Communication									
No.	Statement of Outcomes	Scale							
		0	1	2	3	4	5	Score	Total
		None	Poor	Fair	Average	Good	Excellent	Portfolio	
CLO 4	Evaluate the impact of the Internet in communication.	Unable to evaluate the impact of internet in communication.	Able to name some issues of internet in communication.	Able to describe some issues of internet in communication.	Able to evaluate some impact of the internet in communication.	Able to evaluate the impacts of internet in communication few examples.	Able to evaluate the impacts of internet in communication and relate them to current practices.	3	60%

Summary of Scores (Table 11) for subject Record Management (MRM502).

Table 11 : Summary Score of Record Management

CLOs	Rubrics score		3AHP score	
CLO 1	4	80%	SAME	80%
CLO 2	4	80%	SAME	80%
CLO 3	3	60%	ALIKE	60%

Summary of scores (Table 12) for Business Communication (MBC504)

Table 12 : Summary Score of Business Communication

CLOs	Rubrics score		3AHP score	
CLO 1	3	60%	ALIKE	60%
CLO 2	3	60%	ALIKE	60%
CLO 3	3	60%	ALIKE	60%
CLO 4	3	60%	ALIKE	60%

4. Findings

Based on each Course Learning Outcome (CLO) of the subject, a single score could be generated.

The above study shows that both traditional way of rubrics assessment and 3AHP framework assessment generate similar results. Due to the fact that portfolio is assessed through an overview instead of meticulously and laboriously checking, the 3AHP framework could help to simply the assessment of portfolio processes.

5. Conclusion

The findings of this empirical study do indicate that the 3AHP framework helps to simplify the complexity of assessment of portfolio processes and offers a reliable alternative assessment of portfolio based on Saaty's Analytic Hierarchy Process (AHP). It is generic and structured in nature and could be applied to any specialization of disciplines.

Using 3AHP framework approach to assess portfolio is considered much easier and cost-saving compared to rubrics, weightage and scores. However, it is recommended that other institutions of higher learning to adopt and assess the efficacy of 3AHP more widely in order to provide more reliable and stable AHP applications via worldwide empirical evidences.

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Appendix: Eight Principles on Portfolio Assessment

Principle #1: Learning Outcomes

Students are guided by clearly articulated individual, course, programmatic, or institutional outcomes in their collection, selection, reflection upon, and presentation of "artefacts" (various electronic documents) in the e-portfolio.

Principle #2: Digital Environments

Students develop digital literacies in composing, collaborating, and recordkeeping, and consider the rhetorical implications of circulating e-portfolios to both public and private audiences.

Principle #3: Virtual Identities

Students represent themselves through personalised information that conveys a web-savvy and deliberately constructed ethos for various uses of the eportfolio. Students manage those identities by having control over artifacts and who sees them through privacy and access tools.

Principle #4: Authentic Audiences

Students engage in audience analysis of whom intend to read their portfolio/eportfolios, not only to accommodate faculty, but also employers, issuers of credentials, family, friends, and other readers. Students coordinate access to their e-portfolios with faculty, programs, the institution, and other readers.

Principle #5: Reflection and E-portfolio Pedagogy

Students create "reflective artefacts" in which they identify and evaluate the different kinds of learning that their e-portfolios represent. In particular, students may explain how various forms of instructive feedback (from faculty, Writing Centers, peers, and other readers) have influenced the composition and revision of their various e-portfolio artefacts, making teaching methods and learning contexts more transparent to their readers.

Principle #6: Integration and Curriculum

Connections Students link artefacts in a flexible structure that synthesises diverse evidence and ideas, invites linear or non-linear ways to read and evaluate e-portfolios, and makes connections to portfolio-related evidences and relationships distributed across the Internet. Students may therefore use linking to represent how e-portfolio artefacts inter-relate with other courses in the larger context of whole-curriculum learning.

Principle #7: Stakeholders' Responsibilities

Students receive the necessary support from faculty, program directors, and university administrators who not only use e-portfolios for assessment purposes and program improvement, but also keep informed about what resources are essential for implementing, maintaining, and accessing eportfolios.

Principle # 8: Lifelong Learning

Students are able to adapt their e-portfolios for various purposes/uses beyond their academic careers, enabling their various readers, in turn, to track their learning longitudinally.