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Dimensions of program relevance towards employment success: Evidence from a graduate tracer study using principal component analysis

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Abstract

In this paper, the researchers use data from the tracer study to characterize the graduate's employment profile, assess the perceived contribution of the program to their personal and professional growth, evaluate the perceived effectiveness of the delivery of the graduate program, and explore significant dimensions of curricular program relevance toward employment success. Tracer studies are common in higher education to evaluate, using relevant metrics, the effectiveness of the curricular programs. The researchers employed a cross-sectional research design and analyzed the results from a tracer study conducted in a Philippine state university among its graduates in the Master in Management program from 2020-2022 using descriptive, open-coding, and principal component analysis techniques. The results revealed that pursuing graduate studies enhanced graduate's employment opportunities. The effective delivery of the graduate program contributes to the personal and professional growth of the graduates. Developing the graduate's personal skills is shaped by many factors encompassing people, problem-solving, information technology skills, meeting present and future professional needs, exposure to the local and international communities within the field of specialisation, critical thinking skills, salary improvement and promotion, and personality development. Improving the graduates' professional skills entails a strong foundation in the academic profession, research capability, learning efficiency, and communication skills. Indeed, the professional and personal growth of the graduates are the critical dimensions of curricular relevance. The graduates give a premium on the aspects of the curriculum that lead to their personal and professional development.

Keywords
personal growth, professional growth, curricular delivery effectiveness, curricular relevance, graduate tracer study, employment success, principal component analysis, program relevance

Introduction

The continued disruption in the educational landscape from volatility, uncertainty, complexity, and ambiguity (Bennis & Nanus, 1985) up to the present, the brittle, anxious, non-linear, and incomprehensible (Cascio, 2020) world, drives colleges and universities to keep their relevance to the

students and the job market. Measuring the curricular relevance offers different approaches to education experts. However, tracer studies remain a valuable tool for educational institutions in evaluating the effectiveness of their curricula in preparing graduates for the workforce (Cuadra et al., 2019). Indeed, tracer study and curricular relevance are interdependent concepts in education.

Curricular relevance is crucial to graduates' success as it prepares them for the real world and helps them become well-rounded professionals (Zawawi et al., 2023). Educational institutions continually review and update their curricula to remain relevant to the needs of their students, focusing on their academic and personal development and the job market, which covers the skills and qualifications required for effective performance in the workplace (Kalaw, 2019). Relevant curricula allow graduates to explore the complexities of the job market and adapt to the evolving demands of their chosen fields (Tomlinson & Nghia, 2020). The curriculum is meticulously crafted to provide students with practical experience indispensable to their future professions (Dare et al., 2021). It instils them with essential skills, knowledge, and capabilities that empower them to fearlessly overcome the real-life challenges they might encounter in their careers. Employers highly value graduates who have completed a relevant curriculum as they possess the necessary resources and tools to excel in their chosen careers (de Lange et al., 2023). Moreover, educational institutions increasingly integrate adaptable and transferable skills development in their curriculum to prepare students to navigate the uncertainties of the future job market and empower them to thrive in diverse and evolving professional environments. With these, it makes them more marketable and increases their chances of finding meaningful employment.

Measuring this concept is likewise vital, with the importance of ensuring curricular relevance. Many universities utilise tracer studies as one of the tools for evaluating how the programs offered and delivered by universities effectively address industry needs (Alvarez, 2020). Tracer studies involve tracking the graduates' whereabouts and employment status and seeking their perception of the effectiveness and contribution of the curricular programs in their employment (Cuadra et al., 2019; Albina & Sumagaysay, 2020; Gentova et al., 2023; Reusia et al., 2020). The tracer study aims to identify areas of improvement in the curricula and ensure that graduates are adequately prepared to enter the workforce (Mgaiwa, 2021; Cuadra et al., 2019). By collecting data on the employment outcomes of graduates, educational institutions can assess the relevance of their curricula and make necessary adjustments to meet the job market's needs (Calero-López & Rodríguez-López, 2020; Albina & Sumagaysay, 2020; Reusia et al., 2020).

In the Philippine advanced education sector, characterised by diverse public and private institutions, master's graduates encounter distinct challenges in the job market compared to bachelor's graduates. Master's programs typically specialise students in specific fields, potentially limiting job opportunities to certain industries or roles. Moreover, employers often have higher expectations for master's graduates, expecting advanced skills and deeper knowledge, leading to challenges in finding suitable positions. Considering with these challenges encountered by the master’s graduates in the job market, universities must systematically track alum career paths through tracer studies and gather valuable insights into program effectiveness and industry trends, enabling them to make informed improvements (Dela Cruz, 2022). Consequently, master's programs can better prepare graduates for successful careers, address their unique challenges, and support their professional growth and advancement in the competitive job market.

Moreover, conducting tracer studies remains a recurring institutional task for colleges and universities as mandated by different regulating and accrediting bodies in the Philippines (Cuadra et al., 2019; Reusia et al., 2020; Casanova & Paguia, 2022). This paper seeks to characterise the graduates' socio-demographic and employment features and explore how they perceived the program's contribution to their personal and professional growth and the effectiveness of the curriculum delivery. This paper also tries to discover the significant dimensions of the program's relevance to the graduates' employment success. This study hopes to provide academic administrators with the graduates' evaluation of the program for further improvement.

Theoretical and conceptual framework

This study employs an integrative theoretical model, as presented in Figure 1, combining socio-cultural and active pedagogies to provide a comprehensive framework for analysis. The integration of these theoretical lenses allows for a multifaceted examination of the interdependence of curricular relevance and tracer studies.

The constructivism theory (Piaget, 1964) poses the students' active involvement in learning with a curriculum reflecting real-world scenarios (Rahmawati et al., 2022). Applying the students ' knowledge and skills in practical situations makes them more relevant to the job market (Gomez-del Rio & Rodriguez, 2022). On the other hand, the human capital theory (Becker, 2009) posits that the curriculum should equip students with the necessary skills and knowledge that are in demand in the job market (Wheelahan et al., 2022). A country's economic growth and development largely depend on its highly skilled workforce (Myovella et al., 2020).

Meanwhile, the feedback theory (Wiliam, 2018) suggests that collecting feedback from graduates is necessary for evaluating the effectiveness of the curriculum (Baird & Parayitam, 2019). Subsequently, the input provided can be utilised to implement crucial modifications to the curriculum, guaranteeing its continued pertinence and applicability. Likewise, according to the principles of social learning theory, as proposed by Brieger et al. (2020), it is advocated that the curriculum should be crafted to mirror the societal and cultural milieu within which students are destined to operate. With this, students are effectively equipped to engage with peers in professional settings, enhancing their prospects for achievement in their selected domains.

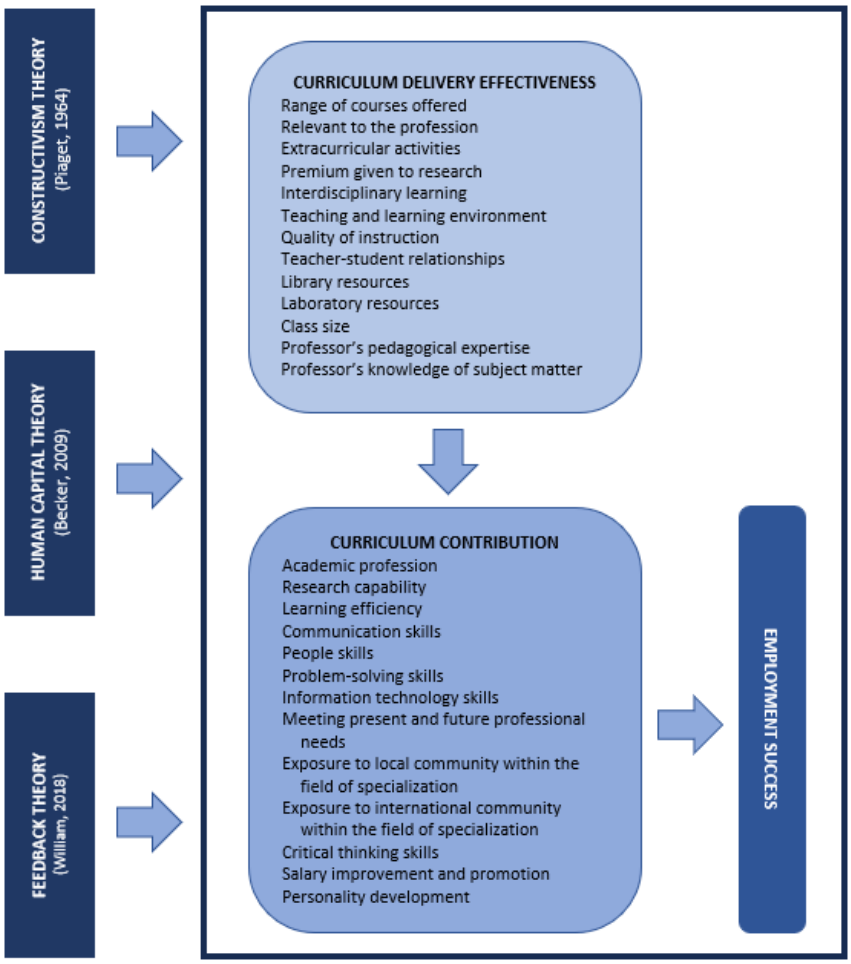

Figure 1. Theoretical and Conceptual Framework of the Study

These theories provide a framework for understanding the concepts of curricular relevance and tracer studies in education. They highlight the significance of engaging actively in the learning process, underscore the requirement to provide students with essential skills and knowledge, stress the beneficial impact of feedback on enhancing performance, and emphasise the value of considering the social and cultural environment in which students will eventually operate.

Linking these theories to the actual concepts used in the study, constructivism theory and feedback theories support measuring the effectiveness of curriculum delivery. In contrast, the human capital theory provides an anchor to measuring how the curriculum contributes to the graduate's personal and professional skills development. This paper highlights the different concepts of program relevance by venturing into the dimensions contributing to employment success. These concepts are immensely discussed in the preceding paragraphs.

Professional skills have a considerable impact on determining the success of academic professionals (Bhandari et al., 2021). Abilities such as time management, project planning, and teamwork are essential for academic productivity and career progression (Majid et al., 2019). Moreover, professional honing skills lead to higher teaching effectiveness, research contributions, and overall academic satisfaction (Pham et al., 2023). Meanwhile, research capability is crucial for academics, enabling them to advance knowledge in their respective disciplines (Mydin & Surat, 2021). Cultivating strong research abilities, including analytical thinking, data analysis, and research design, can increase research output and acknowledgment within the scholarly community (MacPhail et al., 2019).

Professional abilities, such as self-regulation, goal-setting, and time management, can significantly boost an individual's learning efficiency (Chang et al., 2022). Establishing effective learning strategies and habits leads to better academic performance and the ability to grasp complex subjects more effectively (Lapitan et al., 2021). On the other hand, honing exceptional communication skills, encompassing active listening, verbal and nonverbal communication, and presentation abilities, can foster improved relationships, heightened productivity, and superior team performance (Hargie, 2021).

People skills, also referred to as interpersonal or soft skills, are essential for an individual's professional success (Singh Dubey et al., 2022). Individuals with strong people skills excel and create a positive work environment (Gabrielova & Buchko, 2021). Effective communication, empathy, and collaboration foster positive relationships with colleagues and clients, improving job satisfaction and productivity (Tampubolon et al., 2021). Meanwhile, solving problems is crucial for addressing complex situations and achieving desired outcomes in the workplace (Kioupi & Voulvoulis, 2019). Skilled problem-solvers can identify and analyse issues, generate effective solutions, and implement them successfully. This ability ultimately leads to increased productivity, improved decision-making, and overall organisational success.

In the era of rapid technological advancements, information technology (IT) skills have become increasingly important for meeting present and future professional needs (Palvia et al., 2018). IT proficiency increases organisational productivity and competitiveness (Martin-Rojas et al., 2019). In meeting present and future professional needs, Moore's (2020) research highlights the importance of lifelong learning and active skill development for career success. Engaging in continuous learning helps individuals stay competitive in the job market. Furthermore, it enhances their adaptability and versatility, essential for professional growth.

As to exposure to the local community within the field of specialisation, building relationships with professionals within one's local community can positively impact career growth and development (Gore & Rosser, 2022). Networking with local experts enables individuals to access valuable resources, knowledge, and opportunities. This connection to the local community fosters collaboration enhances professional reputation, and supports long-term career success. On the other hand, regarding exposure to the international community within the field of specialisation, Kai Liao et al. (2021) research indicates that cross-cultural experiences can develop essential skills, such as adaptability and

cultural intelligence. These skills contribute to professional success in a global context, enabling individuals to navigate diverse work environments and collaborate with international colleagues (Setti et al., 2020). Exposure to the international community also broadens one's perspective and fosters innovation within one's specialisation.

Critical thinking skills support effective decision-making, problem-solving, and overall professional success (Falcó-Pegueroles et al., 2021). Individuals with strong critical thinking abilities can better analyse complex situations, evaluate information, and generate innovative solutions (Erdoğan, 2019). By enhancing individual performance, critical thinking skills also contribute to team effectiveness and organisational outcomes, making them invaluable assets in the workplace. Meanwhile, as to salary improvement and promotion, personal skills like communication, problem-solving, and leadership are highly valued by employers and directly linked to career advancement and salary improvement (Chala & Bouranta, 2021). Employees with well-developed personal skills are likelier to receive promotions, secure higher-paying positions, and experience greater job satisfaction (Desjardins, 2019). Developing these skills can lead to increased professional opportunities and financial rewards.

Meanwhile, enhancing and fine-tuning personal skills are strongly connected to personality development, as both focus on sharpening vital traits and attributes (Joshi, 2023). Participation in activities that improve personal skills, including communication, empathy, and adaptability, can result in favourable personality transformations (Fernandes et al., 2021). These advancements elevate an individual's professional abilities and positively impact their well-being and progress. Ultimately, these enhancements underscore the significance of personal skill development in achieving comprehensive success.

The effectiveness of the curriculum delivery significantly impacts the graduates' personal and professional growth. It further relates to the employment success of the graduates. An effective curriculum equips individuals with essential personal and professional skills, knowledge, and experiences crucial for success in the job market. Furthermore, a curriculum tailored to specific industries enhances individuals' chances of securing employment aligned with their qualifications and interests. However, it is essential to note that universities do not have complete control over employment outcomes, as a complex interplay of factors within the job market influences employment.

Methodology

Research design

The study employed a cross-sectional research design. Cross-sectional studies are research methodology that involves gathering data at a specific moment to create a snapshot of the target population (Wang & Cheng, 2020). This approach provides a static representation of the population under investigation. The current investigation obtained information through an electronic questionnaire from a specific group of individuals who had attained a Master's degree in Management from a Philippine state university from 2020-2022. Using a cross-sectional design, the researchers obtained a comprehensive perspective on the graduates' employment status and program relevance.

Research setting

The case institution is a state university situated in the eastern part of the Visayas region of the central Philippines. This university currently operates across six campuses in the province. The university offers advanced education, higher technological instruction, and professional training in trade, fishery, agriculture, sciences, education, engineering, business, information, and management. The university has offered the Master in Management program for over 20 years. It has already turned out more than hundreds of graduates working in private or public agencies. The program has received an accreditation level and compliance certificate from a recognised accrediting and regulatory body in

the Philippines. The program has an estimated annual cohort of 128 with an average cohort size of 16 students. Further, the average number of graduates per year is 26.

Sample

Our study includes all graduates of our Master in Management (MM) program from the past three years, with the following distribution: 25 from 2020, ten from 2021, and 23 from 2022. These graduation batches were chosen to accurately reflect recent graduates' experiences and reveal the program's effectiveness. Utilising the three years sample has been consistently used in some tracer studies (Albina & Sumagaysay, 2020; Misni et al., 2020). The researchers want to find patterns in the graduates' experiences and determine what makes them successful after graduating. This study can inform program improvements and help prospective MM students. Meanwhile, out of 58 graduates, 23 responded to the survey, representing a 40% participation rate. The sample consisted of ten graduates from 2020, four from 2021, and nine from 2022, 22% male and 78% female. These participants were employed in various occupations, primarily practicing their profession and occupying clerical positions.

Instrument

The researchers used an institutional tracer survey instrument (Cabalo & Langub, 2023; Dela Cruz, 2022) to assess the MM program's preparation of graduates for careers and personal growth. The survey designed for the tracer study comprehensively covers five parts to gather detailed alum feedback and evaluate the graduate program's impact. The first part characterises the socio-demographic profile of the graduates. Part 2 describes the graduates' employment profile. The third part assesses the graduate program's contributions to the alums' personal and professional growth, covering academic profession, research capability, learning efficiency, communication skills, people skills, problem-solving skills, information technology skills, meeting present and future professional needs, exposure to local and international communities within the field of specialisation, critical thinking skills, salary improvement and promotion, and personality development. Part 4 evaluates the overall program effectiveness, using these variables: ranges of courses offered, relevant to the profession, extracurricular activities, premium given to research, interdisciplinary learning, teaching and learning environment, quality of instruction, teacher-student relationships, library and laboratory resources, class size, professor's pedagogical expertise and knowledge of subject matter. The last part describes the alums' plans for further studies, including degree type and institution.

Parts 1, 2, and 5 use open and closed-ended questions with pre-determined answers while part 3 employed a 4-point Likert-type scale, ranging from 'not contributory' to 'very highly contributory,' to gauge how much the program has contributed to the graduate's personal and professional growth. Any low scores indicate areas where the program could improve to support graduate success. Meanwhile, part 4 utilised the same 4-point Likert-type scale, from 1 (not effective) to 4 (very highly effective). High scores indicate the program's success in achieving educational goals, while low scores highlight areas for potential development. These scales facilitate specific insights into strengths and areas for improvement. This structure provides a holistic view of the program's impact on its graduates and will directly influence future curriculum development and support services.

A rigorous validation process was performed to ensure the reliability and validity of our self-made survey instrument. Subject matter experts reviewed the questionnaire to determine each question's relevance and comprehensiveness to the variables of interest. In addition, a pilot study with a sample group of respondents assessed the questions' clarity and understandability and identified any instrument issues or biases. After revisions, the instrument undergoes a final review to confirm its validity and reliability, ensuring that it accurately captures the desired data and provides meaningful insights into educational programs' effectiveness in preparing graduates for careers and personal growth.

Data collection

We administered an online survey using Google Forms to collect information from the target graduates from April 4 to April 16, 2023. We sent a survey questionnaire link to the alums through their emails and social media platforms, such as their respective active class group chats and individual Facebook messengers. We secured the full consent of the graduates before participation in the online survey. The respondents had the option to maintain the anonymity of their answers. Moreover, we sought institutional approval from the university before the online survey administration. 23 alums out of 58 provided complete responses to the study. Utilising an online survey platform proved instrumental in broadening the reach of our research, allowing us to engage more alums working on different places and garnering a more significant number of responses. Moreover, this digital platform facilitated the secure storage and efficient organisation of these responses, ensuring that data integrity was preserved throughout the process of analysis and interpretation.

Data analysis

This study employed two statistical methodologies: descriptive statistics and principal components analysis (PCA). Using descriptive statistics, we comprehensively understand the data's central tendencies and variability with metrics like the mean and standard deviation. Meanwhile, PCA delves deeper by uncovering underlying patterns and correlations among the variables (Jolliffe & Cadima, 2016). It generates new variables, principal components, that capture the data's essential variability. Using descriptive statistics and PCA, the researchers seek to thoroughly analyse the data to gain a deeper understanding of the research problem and generate insights into the relationship between variables. This integration of methods enables a more comprehensive data analysis and supports the researchers' aim to draw insightful conclusions from their research.

Principal component analysis offers several advantages in this context. Graduate school programs and employment outcomes involve many interrelated variables, and PCA excels at condensing this information to simplify analysis without significant information loss (Jolliffe & Cadima, 2016). It goes beyond simple correlations, identifying latent structures and potential groupings of skills, program qualities, or industry requirements that cluster among successful alums (Webber et al., 2013). PCA results will reveal which specific program elements are strongly associated with positive employment outcomes, providing actionable insights. Tracer studies often look for overarching trends in multifaceted systems. PCA fits this type of investigation well (Yeung & Ruzzo, 2001).

An initial assessment of the data's factor analysis readiness was performed using the KMO test and Bartlett's sphericity evaluation. The KMO test analyses the connections between variables to indicate whether the sample size is sufficient (Kaiser, 1970). It tells us if the dataset is even a good candidate. Bartlett's test sees if variables are unrelated (Bartlett, 1954). Getting the optimal number of components to extract involved consideration of the Kaiser criterion (Kaiser, 1960), the scree plot (Cattell, 1966), and the cumulative percentage of variance (Yeung & Ruzzo, 2001). Kaiser criterion assesses the eigenvalues of each component and suggests extracting components with eigenvalues greater than one. On the other hand, the scree plot graphs the eigenvalues against the number of components and suggests retaining components up to the point where the curve levels off. Finally, the cumulative percentage of variance measures the total variance proportion explained by each component and suggests retaining components that cumulatively account for a substantial amount of variance.

In our analysis of the responses to the open-ended questions, we utilised the open coding technique as delineated by Colaizzi (1978). Employing a systematic approach, we identified recurrent patterns, concepts, and ideas within the qualitative data without predefined categories. Following this initial coding phase, we proceeded with a thematic analysis to extract and interpret the primary themes that surfaced from the data. By integrating these analytical methods, we could thoroughly explore and grasp the profound insights of the open-ended responses.

Results

This section presents the results focusing on the study's objectives. First, we characterise the alums' socio-demographic and employment features. Next, we describe the alums' assessment on the perceived contribution of the program to their personal and professional growth, and the perceived effectiveness of the delivery of the graduate program. In this section, we also present the results of the principal component analysis in exploring dimensions of the program's relevance toward employment success.

Characterising alumni's socio-demographic and employment features

Table 1 presents the socio-demographic and employment characteristics of the graduates of the MM program. The table shows that most graduates are currently employed and working full-time in public companies. These graduates are mostly occupying professional and clerical support positions. Most of the respondents considered the program relevant to their present job. Notably, most are in their early years in their respective companies. Further, most stayed in the same companies since they considered their current job their first after graduation.

Table 1. Description of the Alumni's Socio-Demographic and Employment Characteristics

Socio-demographic and employment features	Frequency n=23	Percentage
Gender		
Male	5	21.74
Female	18	78.26
Age		
21-30 years old	6	26.09
31-40 years old	12	52.17
41-50 years old	4	17.39
51-60 years old	1	4.35
Marital status		
Single	13	56.52
Married	10	43.48
Highest educational attainment		
Masteral degree	23	100.00
Year of graduation		
2020	10	43.48
2021	4	17.39
2022	9	39.13
Employment status		
Currently employed	22	95.65
Unemployed	1	4.35
Employment type		
Working fulltime	20	86.96
Working part-time but seeking fulltime work	2	8.70
Working part-time but not seeking fulltime work	1	4.35
Employer type		
Private	4	17.39
Public	19	82.61
Occupational classification		
Managers	1	4.35

Professional	10	43.48
Clerical support workers	9	39.13
Technicians and associates	2	8.70
Elementary occupation	1	4.35
Current job relevance to the program		
Yes	17	73.91
No	6	26.09
Years in the company	**f**	**%**
1-5 years	13	56.52
6-10 years	6	26.09
11-15 years	2	8.70
16-20 years	1	4.35
25 years above	1	4.35
Place of employment		
Local	23	100.00
First job after graduation		
Yes	12	52.17
No	11	47.83
Reasons for staying on the job		
Compensation-related	3	12.00
Distance-related	3	12.00
Professional growth-related	6	24.00
Tenure-related	7	28.00
Workplace-related	6	24.00
Employment tenure		
Permanent	18	78.26
Casual	1	4.35
Contractual	4	17.39
Total	23	100.00
Employment income		
Below 10,000	1	4.35
10,000-20,000	8	34.78
21,000-30,000	7	30.43
31,000-40,000	6	26.09
71,000 above	1	4.35
Already employed while pursuing graduate studies		
Yes	22	95.65
No	1	4.35

Meanwhile, the alums considered the security of tenure as the main reason for staying on their jobs as they are almost on permanent status. Some regarded professional growth and workplace environment as factors for keeping their respective companies. In terms of employment income, most of them reported an income ranging from 10,000 to 40,000. Further, the respondent's average income can be approximately 25,000, higher than the reported monthly income of 18,423 for 2022 among full-time workers in the Philippines (Statista, 2024). Their income level reflects that they mostly occupy low to mid-level positions in their respective companies. Despite being employed while pursuing graduate courses, a respondent shared that a graduate of the program helps them find a job after one year from graduation. It shows that further studies provide graduates with better prospects of more

secure employment. It is more evident in educational institutions, where higher educational attainment is given premiums in the placement and promotion of employees (Dela Cruz, 2022).

Assessing the perceived contribution of the program to the alums' personal and professional growth and perceived effectiveness of the delivery of the graduate program

Table 2 shows the results of a study that assessed the impact of MM program on its graduates' personal and professional growth. The variables 'research capability' and 'exposure to international community within the field of specialisation' have the lowest mean scores among the assessed factors. Despite having the lowest scores, they are still rated as highly contributing to the personal and professional growth of the respondents. This suggests that while these two aspects may not be the program's strongest features, they are still valuable contributors to the overall growth of the graduates.

Table 2. Perceived Contribution of the Program to Alumni's Personal and Professional Growth

Variables	Mean	Std. Deviation	Description
Academic profession	3.38	.941	Very highly contributory
Research capability	3.19	.694	Highly contributory
Learning efficiency	3.46	.706	Very highly contributory
Communication skills	3.42	.703	Very highly contributory
People skills	3.62	.697	Very highly contributory
Problem-solving skills	3.50	.860	Very highly contributory
Information technology skills	3.65	.892	Very highly contributory
Meeting present and future professional needs	3.62	1.061	Very highly contributory
Exposure to local community within the field of specialisation	3.50	1.334	Very highly contributory
Exposure to international community within the field of specialisation	3.19	1.600	Highly contributory
Critical thinking skills	3.62	1.627	Very highly contributory
Salary improvement and promotion	3.69	1.828	Very highly contributory
Personality development	3.88	1.966	Very highly contributory

Note: 1.00-1.75-not contributory; 1.76-2.50-moderately contributory; 2.51-3.25-highly contributory; 3.26-4.00-very highly contributory

The mean score of 3.38 for the academic profession indicates that the program is considered to have highly contributed to the graduates' academic careers, providing a solid foundation in their chosen professions. The standard deviation of .941 shows some variation in the responses, but overall, the program substantially impacts this aspect of the graduates' development.

The graduates rated 'personality development' as the most impactful aspect of their personal and professional growth, with a mean score of 3.88 and a high standard deviation of 1.966. The program was perceived to contribute to graduates' personal growth significantly. Improving one's well-being often manifests through heightened self-confidence (Hewitt, 2020) and emotional intelligence (Extremera et al., 2020). Moreover, emotional intelligence is a valuable asset linked to improved personal and social adaptation (Delhom et al., 2020). As a result, the program has effectively provided students with both practical expertise and professional knowledge while nurturing personal development, increasing self-confidence, heightened emotional intelligence, and enhanced adaptability. Nonetheless, the diverse reactions indicate that although many graduates derived advantages from the program, the degree of influence experienced differed notably from person to person.

The evaluation revealed that all aspects measured had obtained high mean scores, indicating a noteworthy impact on the personal and professional development of the graduates. These results suggest that the MM program has successfully provided a broad range of skills and experiences that have positively influenced the growth of its graduates.

Moreover, none of the evaluated aspects have received a score lower than 'highly contributory,' indicating that the program has consistently excelled in enhancing various personal and professional development areas. Specifically, the program has been effective in developing graduates' academic profession, research capability, learning efficiency, communication skills, people skills, problem-solving skills, information technology skills, critical thinking skills, exposure to local and international communities within their field of specialisation, and meeting present and future professional needs.

Table 3 portrays how the graduates perceived the effectiveness of the MM program at the university. The table shows that most of the graduates described the delivery of the MM program as very highly effective in almost aspect of the curriculum. The respondents rated the highest quality of instruction and teacher-student relationships, which means that the university fulfills its promise of providing quality education to the students and being responsive to the student's needs. The program got lower ratings in the research, library, and laboratory resources, which calls for the university to continue to improve its library and laboratory services to achieve the utmost approval from the constituents.

These results underscore the importance of actively seeking input from graduates to understand their experiences and perceptions, allowing them to identify areas of strength and areas needing improvement. The high ratings for instruction quality and teacher-student relationships emphasise the significance of prioritising quality education delivery. Schools should invest in hiring skilled instructors and fostering positive relationships between faculty and students to enhance the overall learning experience. On the other hand, the lower ratings in certain areas, such as research, library, and laboratory resources, stress the need for continuous improvement. Schools should not become complacent with their current offerings but instead strive to identify areas for enhancement and invest resources accordingly.

Table 3. Perceived effectiveness of the delivery of the graduate program

Variables	Mean	Std. Deviation	Description
Range of courses offered	3.43	.590	Very highly effective
Relevant to the profession	3.48	.593	Very highly effective
Extracurricular activities	3.26	.752	Very highly effective
Premium given to research	3.13	.757	Highly effective
Interdisciplinary learning	3.48	.593	Very highly effective
Teaching and learning environment	3.57	.662	Very highly effective
Quality of instruction	3.65	.573	Very highly effective
Teacher-student relationships	3.65	.573	Very highly effective
Library resources	3.17	.717	Highly effective
Laboratory resources	3.17	.717	Highly effective
Class size	3.52	.593	Very highly effective
Professor's pedagogical expertise	3.61	.583	Very highly effective
Professor's knowledge of subject matter	3.61	.583	Very highly effective

Note: 1.00-1.75-not effective; 1.76-2.50-moderately effective; 2.51-3.25-highly effective; 3.26-4.00-very highly effective

Exploring dimensions of the program relevance towards employment success

Principal components analysis

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, developed by Kaiser (1970), is a statistic used to assess the suitability of performing factor analysis on a given dataset. The KMO value ranges from 0 to 1, with higher values indicating a greater degree of common variance among the variables, making factor analysis more appropriate (Hutcheson & Sofroniou, 1999).

A KMO value of 0.779 implies that the degree of common variance among the variables in the dataset is quite satisfactory for conducting factor analysis. As suggested by Kaiser (1970) and Hutcheson and Sofroniou (1999), KMO values can be interpreted in the following manner:

KMO < 0.5:	Unacceptable – Factor analysis is not recommended.
0.5 ≤ KMO < 0.6:	Miserable – Factor analysis is not recommended but may still be performed with caution.
0.6 ≤ KMO < 0.7:	Mediocre – Factor analysis may be performed, but the results may not be highly reliable.
0.7 ≤ KMO < 0.8:	Good – Factor analysis should yield reasonably reliable results.
0.8 ≤ KMO < 0.9:	Great – Factor analysis should yield highly reliable results.
0.9 ≤ KMO ≤ 1.0:	Superb – Factor analysis should yield reliable results.

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.779
Bartlett's Test of Sphericity	Approx. Chi-Square	509.114
	Df	78
	Sig.	.000

Once the KMO and Bartlett's tests are passed, the principal components analysis can be carried out. The following criteria will be applied to determine the number of components to extract.

1. Scree Test

Figure 2 illustrates that the inflection point, or 'elbow,' is at component 3. This implies that the components to the left of this point should be retained for further analysis. In this case, there are approximately two significant components that should be kept for subsequent interpretation and investigation.

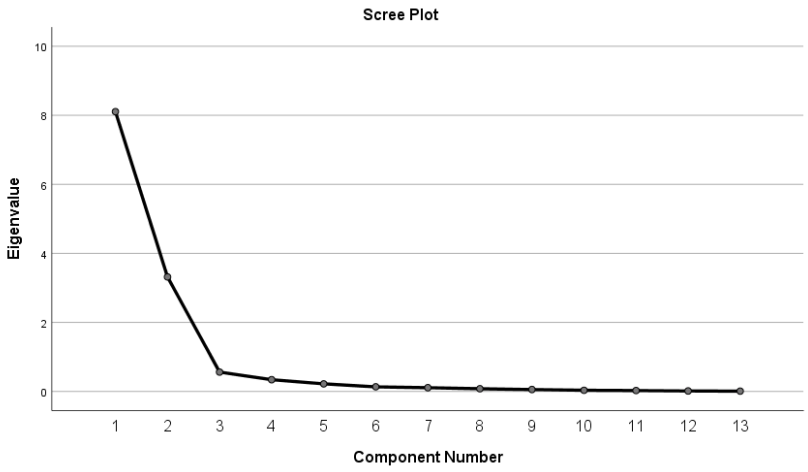

Figure 2. Scree Plot of the Variables of the Study

2. Kaiser criterion

As indicated in Table 5, two components have eigenvalues exceeding one. This observation is important when considering the Kaiser criterion, which suggests that a two-component solution should be extracted for further examination (Kaiser, 1960). The Kaiser criterion is a widely employed method in factor analysis to determine the optimal number of components to retain, positing that only components with eigenvalues greater than one are meaningful since they account for more variance than a single variable (Cattell, 1966). Thus, under this guideline, our analysis supports extracting two components to effectively capture the underlying patterns present in the data (Costello & Osborne, 2005).

Table 5. Eigenvalues and proportions of 13 variables

Component	Total	% of Variance	Cumulative %
1	**8.106**	62.357	62.357
2	**3.317**	25.517	87.874
3	.561	4.314	92.188
4	.340	2.613	94.801
5	.220	1.693	96.494
6	.134	1.027	97.522
7	.108	.829	98.351
8	.078	.599	98.949
9	.055	.426	99.376
10	.033	.257	99.633
11	.025	.194	99.827
12	.014	.106	99.933
13	.009	.067	100.000

Extraction method: Principal component analysis.

Table 6. Principal Components Loadings

Variables	Component	
	1	2
Academic profession	-.290	**.797**
Research capability	-.048	**.886**
Learning efficiency	.170	**.958**
Communication skills	.418	**.836**
People skills	**.621**	.594
Problem-solving skills	**.817**	.478
Information technology skills	**.922**	.239
Meeting present and future professional needs	**.954**	.105
Exposure to local community within the field of specialisation	**.952**	.155
Exposure to international community within the field of specialisation	**.943**	.011
Critical thinking skills	**.985**	.004
Salary improvement and promotion	**.940**	-.083
Personality development	**.975**	-.071

The PCA outcomes (see Table 6) identified two distinct components that accurately capture the underlying framework of the data. These components, termed ‘personal skills and professional skills, offer a comprehensive view of the relationships between variables in the dataset, highlighting the key dimensions of the data under investigation. By pinpointing and categorising these components, the PCA streamlines the multivariate data and enables a complete examination of the elements influencing individual achievements and accomplishments in both personal and professional settings.

The first component presents a linear equation delineating the relationship between multiple factors contributing to personal skills. Each factor is assigned a coefficient indicating its relative significance in shaping overall personal skills. It can be gleaned from the equation that people skills, denoted by a weight of 0.621, contribute moderately to personal skills, encapsulating competencies in interpersonal communication, teamwork, and leadership. Problem-solving skills, with a coefficient of 0.817, are essential, signifying adeptness in identifying and resolving complex issues. Information technology skills are highly valued, reflected by a weight of 0.922, acknowledging the indispensability of technological proficiency in contemporary professional settings.

The readiness to meet both present and future professional demands weighed at 0.954, underscores the necessity of adaptability. Exposure to both local (0.952) and international (0.943) professional communities highlights the significance of networking and global perspectives. Given a coefficient of 0.985, critical thinking skills are highly esteemed for their role in analytical reasoning and informed decision-making. Factors like salary improvement and promotion (0.940) underscore the interplay between personal skills and career advancement opportunities. Lastly, personality development, weighted at 0.975, is identified as pivotal, encompassing traits such as self-awareness and resilience.

Collectively, these findings elucidate the multifaceted nature of personal skills, influenced by a diverse spectrum of factors ranging from interpersonal dynamics to technical proficiencies. By recognising and prioritising these elements, individuals can augment their skills range, enhancing their efficacy and accomplishments across various personal and professional domains.

On the other hand, the second component serves as a comprehensive model for evaluating professional skills, wherein each constituent factor is weighted by a coefficient indicative of its relative significance in shaping overall professional competence. A detailed examination of these factors reveals a multifaceted landscape of skill components essential for success in professional contexts. Academic proficiency, denoted by a weight of 0.797, emerges as a fundamental pillar, underscoring the importance of foundational knowledge, theoretical understanding, and academic achievements within one's field of expertise.

Further, the equation underscores the pivotal role of research capability, which holds significant importance with a coefficient of 0.886. This aspect encompasses various skills essential for scholarly exploration, including crafting research methodologies, analysing data, and interpreting and disseminating findings. Similarly, learning efficiency emerges as a crucial factor in shaping professional skills, highlighted by its weight of 0.958. It reflects the necessity for adaptability, agility, and the adept application of knowledge within dynamic professional settings.

Likewise, practical communication skills, with a coefficient of 0.836, are identified as indispensable for professional achievement. This component involves effectively expressing ideas, collaborating harmoniously with colleagues, and nurturing meaningful professional connections. These insights illuminate the intricate nature of professional skills, blending elements of academic proficiency, research capability, learning efficiency, and communication aptitude. By acknowledging the relative significance of each component, individuals can strategically prioritise their efforts in skill development, thus bolstering their efficacy and success across various professional arenas.

Discussion

Building on the results of this paper, we highlight critical areas in the graduate program relevance and delivery that significantly contribute to the graduate's employment success.

First, pursuing further studies offers graduates enhanced opportunities for securing more stable employment. Graduates' educational attainment is positively associated with their ability to obtain permanent employment (Ojala et al., 2021; Dela Cruz, 2022; Reotutar et al., 2023). Those with higher levels of education were more likely to secure permanent positions (Lewandowska & Stopa, 2020) and have greater chances of getting a job (Amani et al., 2022) compared to those with lower levels of education. This finding underscores the importance of education in the job market and highlights the potential benefits of pursuing higher levels of education for securing stable employment opportunities. It implies that employers may value and prioritise candidates with higher educational qualifications when filling permanent positions. This trend is particularly pronounced within educational institutions, where greater levels of academic achievement are highly valued in both the hiring process and the advancement of personnel and are linked to salary increases (Lee & Lee, 2020). Consequently, individuals with advanced degrees often enjoy preferential treatment in terms of job placement and career progression within these academic settings (İlter, 2020).

Second, the graduate program has demonstrated its efficacy in equipping students with practical expertise and professional knowledge and fostering personal growth. Personal growth and development remain one of the motivations for pursuing a graduate program (Amani et al., 2022; Jones-Teti et al., 2021; Ahmad, 2020). Personal development frequently results in increased self-confidence (Jones-Teti et al., 2021; Hewitt, 2020; İlter, 2020), heightened emotional intelligence (Amani et al., 2022; Extremera et al., 2020), and enhanced adaptability (Delhom et al., 2020). However, it is important to note the varied responses, suggesting that while many graduates benefited from the program, the extent of its impact varied significantly from individual to individual.

Third, a graduate program's impact on professional development is significant. Achieving postgraduate qualifications develops professional portfolios and reach career goals (İlter, 2020) and provide opportunities for professional advancement (Gentova et al., 2023). Engaging coursework, hands-on experiences, mentorship, and specialised knowledge empower graduates to navigate complex environments easily. Access to innovative research and networking opportunities is vital in boosting one's career, leading to professional development and accomplishments. A thoughtfully crafted program builds confidence in graduates, equipping them with leadership skills to excel in their chosen domains (Kayyali, 2024).

Fourth, the program curriculum has proven highly effective in furnishing its graduates with diverse skills and experiences. It is imperative for educational institutions to actively solicit feedback from graduates to gain insights into their experiences and perceptions (Carless, 2020). This approach enables institutions to identify areas of strength and areas requiring improvement (Albina & Sumagaysay, 2020). The high ratings received for instruction quality and teacher-student relationships underscore the importance of prioritising the delivery of quality education. Schools should allocate resources to hire competent instructors and foster positive relationships between faculty and students to enrich the learning experience (Tan et al., 2020). Conversely, the lower ratings in certain areas, such as research, library, and laboratory resources, highlight the necessity for ongoing improvement efforts. Schools must resist complacency with existing offerings and instead remain vigilant in identifying areas for enhancement, allocating resources accordingly to drive continuous improvement (Mohamed Hashim et al., 2022).

Fifth, the intricate and multifaceted landscape of personal skills is shaped by many factors, from interpersonal interactions to technical competencies. Personal skills encompass developing people skills (Singh Dubey et al., 2022; Gabrielova & Buchko, 2021), problem-solving skills (Kioupi & Voulvoulis, 2019), information technology skills (Palvia et al., 2018; Martin-Rojas et al., 2019), meeting

present and future professional needs (Moore, 2020), exposure to the local community within the field of specialisation (Gore & Rosser, 2022), exposure to international community within the field of specialisation (Kai Liao et al., 2021; Setti et al., 2020), critical thinking skills (Falcó-Pegueroles et al., 2021; Erdoğan, 2019), salary improvement and promotion (Chala & Bouranta, 2021; Desjardins, 2019) and personality development (Joshi, 2023; Fernandes et al., 2021). By acknowledging and giving precedence to these diverse elements, individuals can expand their repertoire of skills, thereby bolstering their effectiveness and achievements across a spectrum of personal and professional endeavours.

Lastly, developing the graduate's professional skills entails strong knowledge of the academic profession (Bhandari et al., 2021; Majid et al., 2019; Pham et al., 2023; Kalaw, 2019), research capability (Mydin & Surat, 2021; MacPhail et al., 2019), learning efficiency (Chang et al., 2022; Lapitan et al., 2021), and communication skills (Hargie, 2021). Through a nuanced understanding of the relative importance of each facet, individuals can strategically allocate their resources and efforts toward skill development. This strategic prioritisation enables individuals to enhance their effectiveness and achievements across diverse professional landscapes, eventually facilitating their success in navigating complex professional challenges and opportunities.

Limitations and future directions

While the study utilising principal component analysis to explore program relevance for employment success provides valuable insights, several limitations warrant consideration. These include potential response bias and social desirability effects due to reliance on self-reported data from graduates and constraints imposed by the cross-sectional study design, limiting the ability to establish causality or temporal relationships between program dimensions and employment outcomes. Moreover, the focus on a specific graduate cohort may restrict the generalisability of findings to broader populations or varying educational environments. Further, the analysis overlooks potential confounding variables such as previous work experience or socioeconomic status, which could impact observed correlations. Meanwhile, addressing these limitations, future research could employ longitudinal studies to track graduates over time, utilise qualitative approaches like interviews or focus groups to capture nuanced insights missed by quantitative methods, explore the influence of contextual factors on program dimensions and employment outcomes, and investigate interventions to enhance program relevance and graduates' employability.

Conclusions

This study aimed to explore principal dimensions among those factors that contribute to employment success utilising the data from the tracer study using a cross-sectional research design. This study used principal component analysis in reducing the dimensions measuring the program's contribution and relevance to the graduates' success. The study's findings reveal that the program has fostered professional growth in skill development, career advancement, and personal growth, leading to well-rounded individuals who can thrive in their respective fields. Furthermore, the enhanced employability resulting from the master's program contribution to the graduate's personal and professional qualities positions them favourably to pursue future careers and secure sustainable employment opportunities. With these, the continued quest of the university in conducting tracer studies to get their feedback about the curriculum and its delivery and the persistent submission of the program for regulating and accrediting bodies has come to fruition, as is evident in the graduate's positive perception about the program.

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