Analytics of Certification Courses within Higher Education

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Abstract: In this paper, we describe our University's experience based on the institutionalization of industry-recognized certifications as part of the curriculum, specifically for a number of professional computer education courses of students. This is the initial phase of a longitudinal research that we intend to do with the goal of investigating factors that contribute to the effective use of industry certification courses and exams as a supplemental learning infrastructure as it provides formal learning the very relevant practice, resources and data that will inform instructional/curriculum design. We found that academic performance of students in professional courses is predictive of the MTA passing rates when the course content is aligned to that of the certification exam's topics. With the findings of the data analysis performed in this initial study, we recommend some considerations and guidelines in integrating appropriate certifications to the curricula for higher education using it as a tool for adapting academic learning outcomes to the requirements of the industry.

Keywords: Academic Curriculum, IT Certifications, Certification performance predictors

1. Introduction

Amidst the 4th Industrial Revolution, academic institutions find ways to equip their students with competencies that make them qualified players in this knowledge-based economy. Graduates of Higher Educational Institutions are expected to have high skills that go beyond basic and generalist skills. Industry certifications are the tool of choice to attain industry-required skillsets and recognition of qualifications (Daniels, 2011; Saleem, Gercek, & Varma, 2015). While some recruitment executives still give more weight to formal college degrees than industry certificates (Bartlett, 2002), most employers still recognize the value of appropriate certifications for students that they will be hiring (Wierschem, Zhang, & Johnston, 2010). Industry certifications within formal education settings brings about recognized advantages to students most especially in select fields and careers like those in Computing and Information Technology. Certifications are usually the most sought-after solutions to better equip university graduates and make them more marketable to future employees (Randall & Zirkle, 2005). However, some practitioners believe that industry certifications and formal academic education are mutually exclusive (Hitchcock, 2007) and are not complementary with each other (McKenzie, 2006). The global growth of IT industries paved the way for a highly competitive job market for graduates of universities in the global setting. Students in this field of study are faced with the threat of obsolescence as the skill sets are dictated by the rapidly changing requirements of industries all over the world. To respond to this threat, major players in the IT industry have come up with certifications to ensued that the required and updated minimum skill sets are met by its workforce. Such certifications not only measure the readiness of the graduate to become part of the labor force, but also validates the effectivity of formal education as a preparatory medium for prospective workers requiring a specific skillset.

The College of Computing Education of our University has integrated Microsoft certifications specifically the Microsoft Technology Associate (MTA) in the curricula of students from their first year up to the third year into their programs since 2014. The MTA Certification is one of the entry-level types of certification exams that cover the fundamental skills and knowledge of students in technologies like networking, databases and security fundamentals. Specific to our University's experience, we present the performance of our students in this particular certification exam. Analyze the performance

across the years and use the results of this analysis to come up with curricular recommendations pertinent to institutionalizing industry certifications in the academe.

2. Objectives of the study

With the analysis of the students' academic performance, and a vendor-specific certification course data used as a supplemental learning and assessment tool within a formal course, we intend to:

1. Determine any relationship that may exist between the students' academic performance and their MTA performance; and
2. Recommend curriculum-pertinent policies and practices based on the results of this study to improve future MTA performance of students and possibly, other similar industry-certifications appropriate for their fields of study

3. Data Collection

We gathered the academic grades and MTA certification course logs and performance of an overall total of 389 students for the period 2014-2019 for the following professional courses: Database Management (IT 225L) 112 students, Networking (CS311L) 182 students and Computer Security (IT329L) 98 students. These classes are heterogeneous in nature and were comprised of Bachelor of Science in Computer Science and Bachelor of Science in Information Technology students. The dataset was preprocessed, cleaned and checked for normality and multicollinearity.

4. Data Analysis

For the database management course for the years 2014 to 2019, we found that 89.74% passed the MTA certification exam and 90.60% earned a passing grade for this course. For the networking professional course, we found that 64.84% passed the MTA certification and 87.36% passed the course. For the Computer Security professional course, only 13% and 88% passed the MTA examination and the course, respectively. Performing a trend (linear) regression shows that every year for the duration of this study, there is an increase in the academic performance and the certification exam results for the students who were enrolled as they took the certification course and exam and the performance within the course was predictive of the MTA exam performance. A student's academic performance is measured though his/her grade point average (GPA). The computed correlation coefficient (r) equals .295, indicates some linear relationship at $p<0.05$ level. This illustrates the relationship between the GPA and the MTA exam (r=0.295, $p<0.05$). When reviewing the predictive ability of GPA on MTA results of students, of which, the predictor has an odd ratio of 1.100 times more likely to pass or fail the GPA and MTA within the confidence interval of 1.065 and 1.136. This indicates that the GPA is a significant predictor of the MTA certification exam performance. We also labeled the data in terms of the instructor having previously taken and passed the MTA certification and found that instructors that passed the MTA certification, had classes where there was a high percentage of MTA passing rate and higher academic and course performance of students. We intend to probe into this more in the next phase of this study and look at instructor-related factors like methods of instructional delivery particular to the instructor.

5. Summary of Findings

There is a trend from the analysis that shows the improving performance of the students in the academic courses and the MTA examination. We found that the GPA is predictive of the MTA performance of the students. A qualitative analysis of the results also leads to the conclusion that there is a possible

existing alignment between the learning outcomes and competencies of Database Management and Networking courses to the competencies tested for in the MTA. In the same manner, there may exist some misalignment between competencies in the Computer Security course and the MTA certification as the students who took the Computer Security had a lower MTA passing percentage compared to the other 2 courses. We will be looking further into the mapping of these course competencies with the MTA competencies in the next phases of this work. We further found that instructors who passed the MTA may have contributed to the performance of the students in the same MTA exam. This finding corroborates similar work that states that instructors/teachers have salient implications on the effectivity of using certifications as a supplemental learning tool in post-secondary education (Anderson, 2009; Randall & Zirkle, 2005).

6. Conclusions and Recommendations

To further improve the implementation of industry certifications in the University, we posit the following recommendations based on the results of this initial study: Firstly, to replicate the competencies and learning outcomes of industry certification exams in the curricular course offerings. The MTA exam has been published to have the fundamental topics in IT and Computing across different tracks like, IT infrastructure, Systems Development and Database management. Given these tracks and the embedded competencies within them, we found that our courses are aligned with industry requirements. Further, we also found out that the Computer Security course may need to be reviewed and validated with what the industry demands. Lastly, to institutionalize mechanisms by which instructors are at par with industry requirements as we have found that classes where instructors are certified MTAs have greater passing percentages than those handled by instructors who do not have the said. In conclusion, we recommend that academic institutions treat certification exams as a tool to validate the actual content of instruction being delivered to the students. It is a critical assessment that measures if the learning outcomes are aligned with industry standards. When designing curricula, the appropriateness of certifications to the students' career paths should be given more consideration and not merely aim using certificates as a technical qualification for marketability (Plice, R. K., & Reinig, 2007). For our future work, we intend to investigate other factors that will contribute to the optimization of the use of industry certification as a supplemental learning platform. We also intend to individually model each of the course separately to more accurately inform instructional and/or curriculum design. There could be other factors in play that we intend to investigate as we pursue this research, e.g. prior work experience, quality of student preparation, duration of use or exposure to the certification course as a supplemental learning tool, etc.

References

Andersson, D. L. (2009). Information technology industry certification's impact on undergraduate student perception of instructor effectiveness (Doctoral dissertation, Northcentral University).

Bartlett, I. I. (2002). Preparing, licensing, and certifying postsecondary career and technical educators. Journal of Vocational Education Research, 27(1), 109-130.

Daniels, V. S. (2011). Assessing the value of certification preparation programs in higher education. American Journal of Business Education (AJBE), 4(6), 1-10.

Hitchcock, L. (2007, April). Industry certification and academic degrees: complementary, or poles apart?. In Proceedings of the 2007 ACM SIGMIS CPR conference on Computer personnel research: The global information technology workforce (pp. 95-100).

McKenzie, W. B. (2006). Information systems curriculum revision in a hostile environment: Declining interest, threats from offshore, and proprietary certification. Director, 7.

Plice, R. K., & Reinig, B. A. (2007). Aligning the information systems curriculum with the needs of industry and graduates. Journal of Computer Information Systems, 48(1), 22-30.

Randall, M. H., & Zirkle, C. J. (2005). Information technology student-based certification in formal education settings: Who benefits and what is needed. Journal of Information Technology Education: Research, 4(1), 287-306.

Saleem, N., Gercek, G., & Varma, M. M. (2015). Integrating IT professional certifications into graduate CS/MIS programs: a blueprint for success. International Journal of Engineering Science and Innovative Technology, 4(2), 90-95.

Wierschem, D., Zhang, G., & Johnston, C. R. (2010). Information technology certification value: An initial response from employers. Journal of International Technology and Information Management, 19(4), 89.