Retrospective Evaluation of the Science Education Program in a Philippine State University

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Graduates' retrospective program evaluations can provide relevant and reliable feedback on an institutions' performance in delivering quality instruction and services to its students. This descriptive survey research ascertains graduates' evaluations of science education program areas, including curriculum adequacy and relevance. Study participants comprised of 49 science education graduates of academic years between 2008 and 2018 who were comprehensively sampled from a state university in Central Luzon in the Philippines. A modified online survey questionnaire and an interview guide served as the main data gathering tools. Descriptive and inferential statistics and thematic analysis were used to treat quantitative and qualitative data respectively. Results revealed that the graduate respondents evaluated 10 areas of the science education program as good, indicating that the program outcomes were adequate and relevant. Moreover, the respondents provided varied suggestions for improvement of the science education curriculum. These suggestions include enhancements in instructional resources; pedagogical practice and capability; curriculum content; students' scientific literacy, and research competence. A significant positive high correlation was found between program outcomes' adequacy and relevance. The study therefore concludes that the science education program offered by the university is good, adequate and relevant. An intensive curriculum review may be considered by the university to align the program and course intended learning outcomes to the 21st Century learning landscape and to keep up with technological demands of the Fourth Industrial Revolution (FIRe).

Key words: *Adequacy of program outcomes, fourth industrial revolution (FIRe), relevance of program outcomes, retrospective evaluation, science education program.*

Introduction

University graduates' evaluations can provide accurate and highly useful insights into the effectiveness of an educational institution's curriculum. These retrospective appraisals can assist in ensuring that an institution is research-based, relevant and responsive. Such attributes are especially with the onset of the Education 4.0 vis-a-vis the fourth industrial revolution (FIRe) or Industry 4.0. The FIRe heavily impacts and even dictates many aspects of society, including education and the job market (Morales, 2019). Higher education institutions (HEIs) must therefore align their degree programs to the changing educational landscape and to the new industrial era.

Evaluations through graduate tracer research enables institutions to gain information that may aid in course revisions and improvements (Schomburg & Teichler, 2011), forming the basis for in-depth evaluation of program and university content (Nivera, Toledo, Sualibio, Boral, & Asuncion, 2013). HEIs worldwide employ tracer studies to gain first-hand graduate insight and reliable feedback into the adequacy, acceptability, relevance and effectiveness of curricular programs. Flomo (2013) investigated the congruence between higher education and the labour market in Africa. Similarly, Muk-Ngiik & Hamali (2006) examined the main issues facing graduate employment in Malaysia using empirical evidence obtained from a tracer study.

In the Philippines, several tracer studies have been conducted to ascertain the retrospective evaluations of different programs across various disciplines. Limited tracer studies have been conducted on science education programs, however, which supports the grounds for this study as an effort to bridge the research gap. Evangelista & Morales (2017) conducted a tracer study which determined the adequacy, relevance and alignment of the graduate science education program offered by the Philippine Normal University (PNU) in Manila. Similarly, the science and mathematics programs at the University of San Carlos's College of Education in Cebu were examined in their abilities to facilitate the implementation of a K-12 program (Cañizares, 2015).

The HEI-respondent of this study offers science curricular programs which include a Bachelor of Secondary Education (BSEd) with specialisations in General Science, Physical Science and Biological Science under the auspices of the College of Education, Arts and Sciences (CEAS). Graduates of the CEAS will possess the ability to (1) demonstrate professional competencies, specialised skills and desirable personal and social traits for effective instruction; (2) contribute to developments in teacher education through research, and (3) strengthen external linkages for effective resource-sharing in response to the changing needs of service area industries and personnel. Further, at least 80% of these graduates shall pass the Licensure Examination for Teachers (LET) or obtain a general passing rate above the national level (CEAS, 2018).

Retrospective evaluations may inform an institution of the competencies and insufficiencies of an undergraduate program as well as a program's alignment to the needs of its related industry. Moreover, the evaluation process may enable HEIs to examine and implement the most important and useful skills required in the workplace. The tracer study, in which retrospective evaluation is anchored, can show the success of educational efforts pertaining to its graduates, the labour market, and employers (Aquino et al., 2015). This study ascertains graduates' retrospective evaluations of the science education program in a state university in the Philippines, an area of research that is lacking in existing literature.

Retrospective evaluation through the graduate tracer study

Retrospective evaluations through tracer studies can effectively help institutions identify areas for growth and development in the context of quality assurance and the provision of relevant preparation and training (Aquino et al., 2015). Hayzameh and Dela Peña (2013) suggest that the tracer study method can effectively generate accurate and quick inputs for the purpose of ensuring the human capital produced by education institutions are able to meet the ever-changing demands of the job market. This is strengthened by Schomburg's (2003) claim that tracer studies are valuable sources of information for evaluating the results and effectiveness of the instruction, education and training of a specific institution.

The tracer study enables institutions to gain insight into the possible deficiencies in pedagogical instruction and performance standards, and can form the basis for future improvements to address such deficiencies (Egesah, Wahome, Langat, & Wishitemi, 2014; Irianto, Sriwahyuniati, & Budiarti, 2017). Tracer studies are significantly beneficial for administrators, students and the wider educational community in ensuring the provision of high-quality degree programs. Likewise, tracer studies are not only used to track those graduates of the institution, but are also employed to monitor adaptation of the university graduates (Irianto et al., 2017).

Appropriate competency standards in the workplace can also be measured with the tracer study in relation to a university's success in industry preparation (Irianto et al., 2017). Several researchers likewise stressed that the tracer study measures the relevance of these workplace competencies, which can improve the curriculum and learning system and thus produce better human resources in the country (Evangelista & Morales, 2017; Hayzameh & Dela Peña, 2013; Irianto et al., 2017). Tracer studies can therefore function as important feedback mechanisms on graduates' acquired skills and subsequent employability. This can likewise document the graduates' retrospective evaluation of a program's adequacy and relevance to its related industry for further educational enhancement.

Science education program in the Philippine curriculum

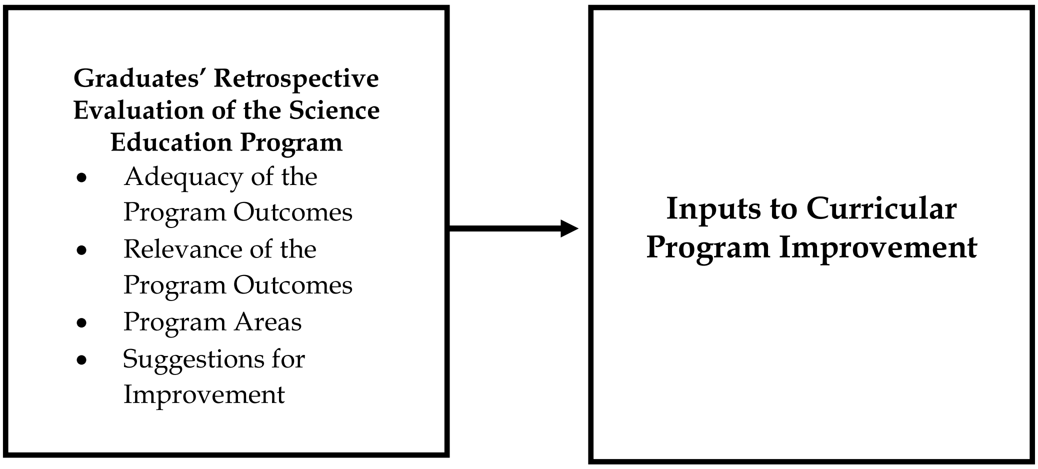
The Commission on Higher Education (CHED) continually updates program outcomes and corresponding skill sets and competencies of teacher education programs (TEPs) to align them with current industry needs. These competencies are clearly stipulated in the intended learning outcomes of the TEPs to guide educators on teaching content and goals. While technical skill competency is vital, graduates must also be trained in interpersonal skills like leadership, teamwork and communication which are vital in ensuring employment and workplace success (Tziner, Vered, & Ophir, 2004).

According to the CHED Memorandum Order 75 (2017), the BSEd program aims to develop highly motivated and competent teachers to specialise in the content and pedagogy of secondary education. The Philippine government thereby acknowledges the capabilities of science, technology, engineering and mathematics (STEM) education and careers to meet the demands of the emerging and highly influential technological revolution. Improved STEM education in the country may lead to a strong and skilled STEM workforce for Industrial Revolution (IR) 4.0, thus improving the country's economy and the citizens' quality of life (Morales, Anito, Avilla, Abulon, & Palisoc, 2019).

The present research employed a tracer study to gain reliable feedback and evaluations from graduates of the Philippine state university. This study aims to bridge the gap on the current lack of local research surrounding the relevance and adequacy of science education programs.

This study is anchored in the concept of institutional self-evaluation through retrospective evaluation (Figure 1). Institutional self-evaluation can be provided by graduate tracer studies (Evangelista & Morales, 2017). Results of this study will therefore aim to substantiate evidence of the program's success in training and developing young individuals to become well-equipped teachers.

Figure 1. Diagrammatical framework of the study



The diagrammatical framework of the study, as depicted above in Figure 1, shows graduates' evaluations of the adequacy and relevance of the science education program areas and outcomes. Suggestions for program improvement are also encouraged from graduates in order to address and solve potential problem areas. The results of the study will serve as inputs for the improvement of the curricular program.

Methodology

A descriptive survey research design was employed in this study to describe the graduates' evaluations of the science program. The respondents of the study comprised of 49 science education university graduates who were selected using the universal sampling technique to ensure accurate study results. Of the 74 initially traced graduates, 49 individuals responded in the online survey which obtained a 66.22% sampling rate.

The Science Education Graduate Tracer Study (SE-GTS) survey questionnaire was used to gather data. The survey was modified from the tracer study questionnaire developed by the Commission on Higher Education (CHED) and from several other relevant studies (Evangelista & Morales, 2017; Gines, 2014; Mancao, 2010; Nivera et al., 2013). The tool determines the retrospective evaluations of the program areas and the adequacy and relevance of the science education program outcomes. The last part is an open-ended question for respondents to provide suggestions of curriculum improvements. The tool was subjected to construct and content validity and yielded an excellent internal consistency (α=0.977). Specifically, the program areas obtained a reliability index of 0.857 (10 items), the adequacy of program outcomes obtained a reliability index of 0.989 (20 items) and the relevance of program outcomes obtained a reliability index of 0.993 (20 items). Ibanez as cited in Rondaris, Ibañez and Varela (2014) contends that an instrument's score is only interpretable when it possesses a substantial internal consistency and when all items in the instrument obtain the same construct measurements. Internal consistency correlations therefore serve as indicators of homogeneity, with Cronbach's Alpha being the most widely used measure.

The first phase of data collection was the development and validation of the research questionnaire. The initial tracing of graduates was then conducted through networks sourced from the Office of the Registrar. The survey tool was transformed in a Google form for easier data gathering. A link for the online survey questionnaire was sent to respondents via social media like Facebook Messenger and email. The researcher allowed for a two-week response window, during which a follow-up was sent to increase retrieval rate. Data gathering started on November 2, 2018 and finished on December 24, 2018.

Both quantitative and qualitative methods were employed to analyse the data. The descriptive and inferential statistics were computed using the Statistical Package for Social Sciences (SPSS) software version 25. Manual coding of qualitative data was conducted to identify the emerging themes culled from the verbal responses through thematic analysis, after which validation of identified themes was completed.

For ethical considerations, the respondents' informed consent form was secured prior to study participation. Individuals were entitled to withdraw from the study at any time. Personal information was treated as confidential and was available only to those with direct involvement in the research study. Coding scheme was also used in reflecting the respondents' qualitative responses. The selections of the respondents, data collection tools and methodology were free from any bias. The graduate-respondents were informed about the benefit that they may receive in the conduct of the study. This was made before consent was given to the researcher by the respondents.

Results and Discussion

Retrospective evaluation of the science education program areas

Table 1 shows the respondents' retrospective evaluations of various aspects of the science education program:

Table 1: Retrospective evaluation of the program areas

Area	Mean	SD	VD	Rank
1. Vision, Mission, Goals and Objectives (VMGO)	3.55	0.68	VG	1
2. Faculty Competence	3.35	0.69	G	3.5
3. Curriculum and Instruction	3.35	0.66	G	3.5
4. Support to Students	3.16	0.62	G	6
5. Research Development	3.53	0.74	VG	2
6. Extension and Community Involvement	3.24	0.69	G	5
7. Library Services	2.80	0.71	G	10
8. Physical Plant and Facilities	2.88	0.78	G	9
9. Laboratories	3.02	0.83	G	7.5
10. Administration and Management	3.02	0.78	G	7.5
Overall	**3.19**	**0.54**	**Good**	

Results reveal that the graduates' collective evaluation of the science program is good with an overall mean of 3.19. The VMGO (M=3.55) and Research Development (M=3.53) obtained the highest ratings which were classified as very good (VG). This implies that the program is congruent with university goals and other national agenda. The very high rating for Research Development supports the institution's redirected vision to be a research university and its pursuit in developing quality research culture in teacher education. Faculty Competence (M=3.35) and Curriculum and Instruction (M=3.35) ranked next in the evaluations and were rated as good (G).

Lower means, but within the good (G) assessment, were obtained in Library Services (M=2.80) and Physical Plant and Facilities (M=2.88). Establishment of adequate and satisfactory educational facilities should be an institution's major priority (Jacob & Orleans, 2016). Nevertheless, the respondents' good to very good evaluations of the ten program areas are indicative that the university is an effective training ground which can help graduates in their professional careers as educators. Institutions of higher learning can thereby make informed and evidence-based decisions about the potential improvement of their services through evidence gleaned from the tracer study (Schomburg, 2007).

Adequacy and relevance of the science education program outcomes

Table 2 presents the extent of the adequacy and relevance of the science education program outcomes:

Table 2: Adequacy and relevance of the curricular program outcomes

Curricular Program Outcomes	Adequacy			Relevance		
	Mean	SD	QI	Mean	SD	QI
1. Displays basic and comprehensive understanding of knowledge, principles of the subject matter in the sciences.	3.37	0.76	A	3.22	0.80	R
2. Applies the scientific principles in solving current problems.	3.35	0.72	A	3.22	0.85	R
3. Manifests meaningful and comprehensive pedagogical content knowledge (PCK) of science.	3.35	0.69	A	3.22	0.80	R
4. Uses scientific inquiry in understanding and explaining natural phenomena.	3.47	0.68	A	3.29	0.82	R
5. Provides examples to illustrate the application of mathematical concepts and procedures.	3.39	0.73	A	3.27	0.84	R
6. Designs and utilises appropriate instructional materials in science.	3.41	0.76	A	3.27	0.81	R
7. Employs effective teaching techniques for diverse types of learners in varied learning conditions.	3.41	0.67	A	3.24	0.72	R
8. Designs and utilises a variety of appropriate assessment techniques to monitor and evaluate science learning.	3.49	0.74	A	3.33	0.72	R
9. Analyses assessment results to improve learning and teaching.	3.41	0.73	A	3.20	0.74	R
10. Provides regular feedback to students.	3.18	0.75	A	3.10	0.82	R
11. Utilises appropriate pedagogy and use of technology for different science content areas.	3.39	0.67	A	3.24	0.78	R
12. Demonstrates learning skills in various methods of teaching-learning, including science investigations and research and making models and prototypes.	3.35	0.75	A	3.18	0.83	R
13. Creates and utilises learning experiences in the classrooms to develop learners' skills in discovery learning, problem learning and critical thinking.	3.24	0.69	A	3.18	0.83	R
14. Manifests creativity and critical thinking when selecting examples and problems	3.41	0.70	A	3.24	0.85	R

to be used in the classroom and in the assessment of students' learning.						
15. Uses varied resources for selecting and creating problems to develop the students' problem-solving skills.	3.24	0.78	A	3.22	0.87	R
16. Develops lessons that can help students appreciate the use of science in daily life.	3.35	0.80	A	3.29	0.84	R
17. Promotes positive values and attitudes in science education.	3.49	0.77	A	3.33	0.88	R
18. Develops innovative curricula, instructional plans, teaching approaches, resources and training programs for diverse science learners.	3.37	0.73	A	3.20	0.87	R
19. Proposes curriculum reforms that are relevant to the emerging trends and issues both in the national and international levels of the science industry.	3.29	0.76	A	3.22	0.87	R
20. Exhibits proficiency in relating science to other curriculum areas.	3.43	0.71	A	3.22	0.85	R
Overall	**3.37**	**0.65**	**A**	**3.24**	**0.75**	**R**

These results show that respondents evaluated the curriculum program outcomes as adequate (M=3.37) and relevant (M=3.24), indicating that graduates found the program to be sufficient and very useful in their professional growth as science teachers. They further identified that competencies on the preparation of instructional materials and resources, as well as promoting positive disposition in science teaching, were adequate and relevant. Evidently, these are also required competencies in the Philippine Professional Standards for Teachers (PPST) framework (Department of Education-Teacher Education Council, 2017) and in the Philippine science teacher education framework (SEI-DOST & UPNISMED, 2011).

Competencies in feedback mechanism, scientific research and inquiry-based learning experience produced the lowest adequacy rates, which could be further enhanced in the curriculum. These results may serve as baseline data to align the science education program with the ASEAN (Association of Southeast Asian Nations), national and international standards. As indicated by Evangelista & Morales (2017), modifications may generate better results which will subsequently raise the global competitiveness index of the country in terms of education. Novel and suitable learning outcomes may be required to enhance the quality of learning and the production of skilled manpower and human capital, which will aid the country in keeping up with rapid global and economic development (Blankley & Booyens, 2010; Lane, 2014, EDB, 2016; as cited by Morales et al., 2019).

Respondents' suggestions on improving the science education curriculum

Table 3 below outlines suggestions made by the graduates for ways in which the science education curriculum may be improved. These recommendations are further detailed in the following analysis section.

Table 3: Respondents' suggestions on improving the science education curriculum

Theme	Significant Statement	Frequency*
Upgrade laboratory and instructional facilities.	"…further improve physical facilities and laboratory equipment to better enhance the hands-on learning among your learners." *[SEG27, Male]* "…laboratories and internet connectivity on Campus." *[SEG19, Female]*	18
Spearhead capability-building activities.	"Support them [the students] in every activity related to their course, especially seminars and workshops." *[SEG2, Female]*	3
Improve pedagogical practices.	"…exposing them [students] to field studies, field tours and laboratory activities." *[SEG24, Male]* "Improve the teaching staff." *[SEG10, Male]*	5
Conduct review of the science education curriculum for K-12 alignment.	"Teach the whole aspect of science to align with the K-12 program." *[SEG5, Male]*	6
Enhance students' scientific literacy.	"…become more focused on helping students think scientifically rather than memorising facts." *[SEG20, Female]* "Expose students to real life scenarios to develop critical thinking and holistic teaching experiences." [*SEG29, Male]*	6
Establish extension programs in cooperating schools.	"…extending science innovations to local public high schools." *[SEG17, Male]*	1

Expose students to research and innovation.	"Science education curriculum may be further improved through sending the undergraduate students to research fora/ conferences." *[SEG29, Male]*	4

**multi-response*

Upgrade laboratory and instructional facilities. As indicated in the above table, 18 respondents suggested that the university may consider upgrading the laboratory and instructional facilities in order to improve the science education curriculum. Several respondents suggested to "provide more laboratory apparatuses and laboratory rooms." This was seconded by another respondent, who suggested that the university, "provide more facilities and science equipment." These recommendations may be given priority as educational facilities should house sufficient classrooms and laboratories with manageable class sizes and adequate, up-to-date instructional resources such as laboratory equipment, tools and chemical reagents (Ogunmande, 2005).

Meanwhile, one respondent pointed out the need to improve the library and media centre services for the benefit of future science teachers. The purchase of additional books in the library, as well as installation of internet connectivity for research and academic use, was a suggested improvement by the respondents. This conforms to the claim of Jacob & Orleans (2016) that physical facilities are essential in a curriculum's effective implementation as they serve as catalysts of the enhancement and development of the learners' talents, skills and potentials.

Spearhead capability-building activities. Three respondents suggested that the university may spearhead capability-building activities such as seminars, workshops, fora and other training schemes to enhance the holistic skills of science pre-service teachers. One respondent suggested that the program should "support them [the students] in every activity related to their course, especially seminars and workshops." This implies that science education students should be trained in various topics like as pedagogy, assessment, instructional material development, scientific research and other trends and issues in STEM education. Rogayan and Bautista (2019) stressed that educators are expected to make science learning more relevant and more engaging for students amidst a multitude of challenges that confront the teaching of science.

Improve teachers' pedagogical practices. Another suggestion given by five respondents was to enhance the teachers' pedagogical practices to align with the 21st Century learning landscape and respond to the industrial revolution 4.0. Utilising a variety of pedagogical strategies may be considered here, such as the use of field studies, field tours, inquiry-based laboratory activities and other STEM teaching strategies. One participant also suggested to "focus on how the school will improve the teaching-learning process." This offers that the university may also consider sending its faculty to seminars and training sessions in order to enhance professional practice. Rogayan (2018) pointed out that young teachers see themselves as scaffolds towards equipping students with life skills for them to survive in the real world, meaning that continual training even beyond university is required for optimal professional success.

Conduct a review of the science education curriculum for K-12 alignment. Based on suggestions of the six respondents, the university must ensure that the program's intended learning outcomes are aligned with the content and performance standards of the K-12 science curriculum. One participant stressed that "content should be aligned to the basic education curriculum." This suggests that the content being taught most specifically in the specialisation courses must be in alignment with the content being taught in the K-12 program. A multi-stakeholder curriculum review and development program may be conducted to address this concern. The recent implementation of the K-12 Basic Education Program in the Philippines, as well as the regional integration under the ASEAN Economic Community (AEC), demands a great deal of curriculum innovations (Tamoria, 2016).

Enhance students' scientific literacy. Six science education graduates suggested that the university may continue updating the curriculum to enhance students' scientific literacy. One respondent recommended to "develop the scientific inquiry, attitudes and perspectives" of the science pre-service teachers (PSTs). Another respondent said that PSTs must be further engaged in inquiry-based learning situations. This would allow the science PSTs to become more effective and efficient facilitators of science learning when already performing in the required field. Rogayan (2019) suggested that the science education curriculum design and approach face monumental changes instigated by the challenges of globalisation and diversified educational landscapes. PSTs must therefore be equipped with necessary scientific skills as they enter the professional workforce.

Establish extension programs in cooperating schools. One respondent suggested that establishing extension programs in cooperating schools may be an effective method to improve the curriculum. The respondent maintained that "establishing trainings and seminars for science teacher alumni, particularly on new and innovative teaching trends and strategy trainings" may be considered. Department of Education (DepEd) teachers may then also be exposed to beneficial seminars and workshops as part of this extension activity. The extension program may focus on teaching strategies, student evaluation, teaching instrumentation, science investigatory projects (SIP) development and classroom-based action research (CBAR) in science.

Expose students to research and innovation. Four graduates also suggested to conduct trainings and workshops to improve the students' research and innovation skills. One respondent shared that "science education curriculum may be further improved through sending the undergraduate students to research fora/ conferences." This indicates that exposing the students in research and development (R&D) activities may enhance their skills and proficiency in becoming advisers in SIPs or in conducting their CBARs. Science teachers must have the opportunity to conduct research in science teaching and learning, and to share the results of their studies with their colleagues (SEI-DOST & UP NISMED, 2011). As research and innovation is now very active within the teachers' workplace, the institution may consider conducting seminars and similar initiatives to help students enhance their research and innovation skills which are anchored in the P21 framework (Partnership for 21st Century Skills, 2006).

Quality higher education from a global perspective translates into employment, efficiency and productivity. All of these elements drive sustainable economies and desirable social transformations (Egesah & Wahome, 2017). These graduates' suggestions may therefore serve as initial inputs to improve the science curriculum, which will eventually produce more globally competitive and well-equipped graduates to enter into the workforce.

Relationship between program adequacy and relevance

Table 4 shows the relationship between the adequacy and relevance of the science education program outcomes:

Table 4: Relationship between program outcomes adequacy and relevance

Variables	Mean	SD	R	r^2	p-value
Program outcomes adequacy	3.37	0.65	0.866	0.750	p<0.01
*Program outcomes relevance	3.24	0.75			

***Significant at .01*

As gleaned from the above table, there is a positive high correlation between adequacy and relevance as rated by the respondents (r=0866; p<0.01). This data implies that the higher the evaluation of the program's adequacy, the higher the evaluation of its relevance. Such results imply that the program's adequacy is directly related to its relevance in the science workforce. Ensuring the adequacy of learning outcomes will therefore make the science education program increasingly relevant for its students. Once program outcomes are functional and meaningful, students can then effectively translate their learned knowledge and skills into the workplace. These results support the findings of several studies (Belecina & Ocampo, 2017; Evangelista & Morales, 2017; Nivera et al., 2013) that the curricular program was found to be adequate and relevant to the development of graduates' competencies and to their professional career development.

Conclusions and Recommendations

This study determined the retrospective evaluation of graduates from a state university in the Philippines on their completed science education program. The graduates assessed the program areas as good and rated the outcomes as adequate and relevant. The program adequacy is directly related with the program's relevance, meaning that assurance of adequate learning outcomes will increase the program's relevance to current and prospective students. Further, graduates' suggestions in improving the curriculum focused on enhancement of the learning environment; content knowledge and pedagogy; conduct of curriculum review; establishment of community linkages and strengthening of professional engagement in both pre-service and in-service teachers.

The initial evaluation of the graduates gathered from the conducted tracer study implies that the program areas and outcomes are good, adequate and relevant. These strengths may be further enhanced as the university envisions to be a progressive learner-centred research institution. Further, the university must embrace the challenges and opportunities of Education 4.0 by producing industry-ready and globally competitive graduates.

This study recommends that the university may revisit the science education program's adequacy and relevance to ensure its congruence to the K-12 curriculum. Methods of teaching-learning may be reviewed to include science investigations, making models and prototypes and conducting science research. The administration may support the science faculty to attend capability building activities on the current and emerging trends surrounding science content knowledge and pedagogy to improve their teaching skills. In-house training may be provided to pre-service science teachers prior to immersion in the education field, covering an array of topics like student assessment strategies, curriculum planning, handling diverse learners and structuring learning spaces. Strengthening the career guidance program may also encourage increased enrolments in science-oriented programs. Likewise, upgrades to the instructional facilities may further develop students' competencies in response to the demands of the IR 4.0. Lastly, devising a more functional system to trace the graduates and obtain their retrospective evaluation of the program will continue to assist with future reviews and improvements of the program.

As the present study is limited to science education graduates, a similar study may be conducted to retrospectively evaluate programs in other fields offered at the university. This will enable a constructive and useful feedback mechanism for the continued improvement of other curricular and their alignments to the current and emerging needs of their respective industries. Further, inclusions of other stakeholders may be considered in the retrospective evaluation process to broaden and generalise the study.

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