Research Article

The K to 12 Strands Taken by First Year BIT Food Technology Students and Its Effect on Their Academic Performance in Applied Chemistry

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Abstract: This study identified the K to 12 strands of the first year BIT Food Technology students and its effect in their academic performance in Applied Chemistry. Its correlation on the chosen program using contingency coefficient correlation was noted to be insignificant. While using ETA correlation, its moderate correlation was determined between K to 12 strands taken and academic performance in Applied Chemistry of the respondents. Applying inferential statistics, through Kruskal-wallis as a statistical tool, it was found that respondents under STEM strand performed better followed by respondents from TVL-HE and lastly from GAS strand. The significance of bridging program may have an impact on the readiness of the learner though implementation of the bridging program cannot be mandatory and depends on the discretion of higher education institutions. Readiness for college of the senior high school students may be evaluated and a readiness course may be offered to ensure that aside from receiving high school diploma, learners are also college-ready. Gateway course may also be offered in the tertiary level to ensure smooth transition of learning from secondary to tertiary level. This course will be facilitated by a faculty who understands the benefit of higher expectations for K to 12 students and supports the college readiness of the learners. An intense collaborative initiative between the K-12 sector and higher education can be made to improve student academic outcome and college readiness.

Keywords: K to 12 Tracks, academic performance, alignment of track, Food Technology, readiness course, gateway course, bridging course.

Introduction

Aiming to fill the gap of basic education with employment in the global world, "Enhanced Basic Education Act of 2013" also known as Republic Act 10533, was approved last May 15, 2013. By adding two more years, the learner is expected to gain mastery of skills for lifelong learning and prepare for career opportunities. The curriculum prepared graduates to acquire mid-level skills that permit them to grab opportunities even in the global job market (Teach for the Philippines, 2013).

Each student in Senior High School can choose among four tracks: Academic, Technical-Vocational-Livelihood (TVL), Arts and Design, and Sports. The Academic track is for those who have already and surely decided to pursue a college education after Senior High School. Under this, there are four strands to choose from: Humanities and Social Sciences (HUMMS), Science, Technology, Engineering, and Math (STEM), Accounting, Business and Management (ABM) and General Academic Strand (GAS).

Technical-Vocational-Livelihood Track (TVL), on the other hand, focuses on practical knowledge and job-ready training. The four strands under this include: Agri-fishery Arts, Home Economics, Industrial Arts and ICT, Arts and Design Track provides the know-how in the different arts and design forms, materials, media, and production in the creative industries. Lastly, Sports Track is for those who excel in sports (Cueva, 2019). Senior High School (SHS), as part of the K to 12 Basic Curriculum, was developed in line with the curriculum of the Commission of Higher Education (CHED)–the governing body for college and university education in the Philippines (Official Gazette, n.d.). This ensures that by the time they graduate from Senior High School, students will have the standard knowledge, skills, and competencies needed to go to college.

Gravino (2019) in his column at the Philippine Star mentioned that in any changes adopted in an organization, all programs of other divisions shall be aligned so that the impact of implementation is geared to the accomplishment of changes. He added that the programs of each department are expected to contribute to the targeted changes. Such scenario is relevant in the implementation of K-12 Program in Secondary Education. The Department of Education (DepEd) coordinated with the Commission on Higher Education (CHED) through curriculum consultation (RA 10533–Sec 5 & 6), teachers' training and education (RA 10533 – Sec 7), and strategizing the transition (RA 10533–Sec 12).

Other institutions like TESDA, PRC, and DOLE were also coordinated during the development of contingency plans. To appreciate the K-12 Program, the educational system as a whole shall be aligned in a way that the learner whether employed after senior high school or pursued higher education totally benefited instead of recognized the changes made as a burden. As mentioned by Lopez *et al.*, (2017) in Competency Works-October 2017 issue, even the K-12 in the United States is at its turning point. The rapid, inevitable changes in society created new expectations for education, causing the education system to evolve also in order to provide a re-designed education system and structure fit for the intended purpose of the education system.

If the United States is experiencing challenges on its K to 12 Program implementation, how much more the Philippines which is in its embryonic phase of evolution? Lopez et al., (2017) mentioned that the purpose of K-12 education is to facilitate a process through which all students graduate from high school with the academic and lifelong learning skills to be leaders in their communities and agents of their own success-whether in college, career, or in navigating the opportunities and challenges they will encounter in their lives. Synonymously, the K to 12 Program here in the Philippines has the same means of preparing students towards better employment opportunities in the country or abroad and viewed as for the holistic development of the 21st century learners armed with skills necessary for economic and social development of family and society (Cabansag, 2014). The collaboration of DepEd and CHED was notably remarkable in the implementation of K-12 programme to ensure complete transformation of the learner as he passes on the entirety of educational process. This study was made to present the educational system's effectivity by means of preparing learner's readiness in the tertiary level. This shall be done by identifying the K-12 track taken by the respondents, its correlation with the chosen program upon entrance in the university, determining its effect on the academic performance in Applied Chemistry, and lastly identifying which strand performed better in Applied Chemistry. In doing so, the importance of alignment of track taken will be justified since their academic performance through their final academic grade in one major course (Applied Chemistry) in the tertiary level will be used as one of the means in measuring readiness of learners.

On the other hand, the current issue about the CHED amendment in the Policies, Standards, and Guidelines (PSG) which require bridging program will be strengthened. Though, according to Dr. A. Biglete of the Office of Programs and Standards Development (OPSD), "in the exercise of academic freedom, the Higher Education Institutions (HEIs) have the discretion to prescribe or not to prescribe any form of bridging program; bridging program cannot be mandatory."

Method and Materials

The study utilized qualitative-quantitative method of research. All data were quantitatively analyzed in SPSS version 21 statistical software. Descriptive approach was done in determining the respondents' K-12 track, its correlation with the chosen program, and its effect on the academic performance in Applied Chemistry. Inferential Statistics was applied in identifying which respondents' strand performed better in Applied Chemistry. Qualitative approach was performed during interview with the respondents. After responding in the instruments prepared, validation on all data was done through semi-structured interviews with the respondents and focus group discussion.

Purposive sampling was performed in this research. Since this entails with first year Food Technology students as respondents, the total population used in the study are the first year BIT Food Technology students specifically those enrolled at BatStateU-JPLPC Malvar Campus. The group belongs to one section only composed of twenty-two members.

Research instrument was formulated by the researchers based on the objectives of the study. Drafted questionnaire was content and face validated by a panel of experts based on the theoretical constructs. After integrating experts' suggestions and comments, questionnaires were distributed to respondents. An interview with the respondents was done to validate the responses in the questionnaire. Respondents' insights and reasons for choosing Food Technology were elaborated also to elucidate their shared information.

Data gathered were treated statistically using Statistical Package for Social Sciences (SPSS) ver. 21. In summarizing the K to 12 tracks of the respondents, frequency counts were tabulated. In correlating strand with the chosen program, contingency coefficient correlation was done on two nominal variables. Considering 0.05 level of significance, the significant value result of .419, which is greater than α , implied that the null hypothesis is accepted. There is no significant correlation between the strand and the chosen program.

To correlate strand with the academic performance in Applied Chemistry, ETA correlation is used where two variables considered are Nominal (Strand) and Interval data (Final grade). With significant value of .635, serving academic performance as the dependent variable, moderate correlation was noted. Lastly, to identify which of the three strands of the respondents performed better, Mean comparison of their grade was done using Kruskal-wallis. It revealed that STEM strand had the highest mean rank, followed by TVL-HE and GAS strands.

Results

The K to 12 tracks of the first year students taking up BIT Food Technology were shown in Table 1. It can be noted that most of the respondents are from the academic track, specifically under STEM strand, followed by the TVL track –Home economics and lastly from Academic track – GAS. After performing statistical procedure, the results, as shown in Table 2, revealed that there is no correlation between strand and chosen program of the respondents.

In addition, after correlating the strand taken of the respondents with their academic performance in Applied Chemistry, the significant value of .635 presented that there is moderate correlation between the two variables. Respondents were grouped according to their K to 12 strand taken and the means of the three group were compared if there is a significant difference. It was found out that respondents coming from the STEM strand performed best among the three, followed by TVL- Home Economics and lastly GAS strand.

Track	Strand	Number of Respondents	
Academic Tracks	STEM	9	
	GAS	6	
TVL Track	Home Economics	7	

Table 2. Correlation between K to 12 strand taken and chosen program of the	9
respondents	

Variables	Contingency	Significant	Interpretation	Decision
	Coefficient	value		to
Strand and Chosen	.564	.419	Not	Accept
program			significant	

Table 3. Correlation between K to 12 strand taken and academic performance in Applied Chemistry of the respondents

Variables	Statistical	Coefficient	Significant	Interpretation
	Test	value	Values	
K to 12 Strand and	ETA	Academic	.635	Moderate
Academic	Correlation	performance		correlation
Performance		Dependent		

Table 4. Mean comparison of the academic performance of the Three strands

Variables	Statistical Test	Significant	Interpretation	Decision
		value		to
Grade and Strand	Kruskal-Wallis	0.007	Significant	Reject

Table 5. Rank of three strands based on the mean rank of the grades in Applied Chemistry

Strand	Total number of	Mean rank	Rank
	respondents		
STEM	9	7.11	First
GAS	6	17.33	Third
Home Economics	7	12.14	Second
	22		

Discussion

In this study, the track taken of the respondents was identified. Majority of the respondents came from the STEM strand, followed by TVL-Home Economics and lastly with GAS strand. It can be seen here that none of them came from the expected disciplinal cluster. Food technology as a discipline belongs to TVL track, agriculture strand (Biglete, n.d.). In trying to determine the relationship between strand taken and chosen program of the respondents, contingency coefficient correlation was inferentially done. It was found out that the strand of

the respondents has no correlation with their chosen course. The Department of Education (DepEd) ensures the promotion of relevant education that responds to the needs of the government, industry, and the economy. The creation of National Secondary School Career Guidance and Counselling Programs (CGCP) and implementation of National Career Assessment Examination (NCAE) served as a guide for the students in choosing their career path to take (Philippine Congress, 2018).

DepEd, in their own way, assisted students in deciding what track to take in the Senior High School and even what program to pursue in the higher education. Even with these efforts done, evidence still exists of discontinuity in policies and practices between the sectors. Educators in each sector are not fully aware of the academic requirements of the other sector, learners can earn high school diploma but struggle with college-level work (DeMaria *et al.*, 2015). Among the respondents, 73% (16 respondents) only choose Food Technology as a program to be pursued others tried Hotel and Restaurant Management, Psychology, Engineering, and Computer-related programs. Among those who chose Food Technology, only 25 % (4 respondents) of them preferred the program. Upon the validation of data conducted through interview, it was found out that majority of the respondents failed to secure other programs due to reasons like low academic grade in the secondary level and low result of entrance exam. Given a chance to take Food Technology, they will pursue the said program.

After correlating the respondents' strand taken with their academic performance in Applied Chemistry, moderate correlation resulted on ETA correlation with significant correlation coefficient of .635. Using Kruskal-wallis as a statistical tool, it was found out that those from STEM strand performed better while those from GAS strand performed least. By spiral progression, Science and Math education are strengthened in the K-12 Enhanced Basic Education Program. It allows the learner to learn topics and skills appropriate to their developmental stages. It is also believed that it strengthened retention and mastery of topics and skills while revisited and consolidated with increasing depth and complexity, the learning in the succeeding grade levels (Quijano *et al.*, 2012).

Senior High school Curriculum Guides (version August 2016) presented senior high school core curriculum subjects and noted science subjects such as Earth and life Science, Physical Science and Earth Science (taken instead of Earth and life Science for those in the STEM strand) to be taken across all strands. However, it is in the STEM strand only where voluminous science subjects were given. It includes: General Biology 1 & 2, General Physics 1 & 2, and General Chemistry 1 & 2 (Department of Education, 2018).

The presence of varied Sciences in the STEM strand strengthened their foundation in science. Due to this ample background of science courses in the STEM strand as compared to GAS and TVL-HE, they performed better in Applied Chemistry. In the K-12/Higher Education Alignment, July 2015 issue, key elements of alignment agenda were recognized. The achievement of high school diploma does not signify college readiness of the learner.

The components of college readiness include: academic content knowledge-defined by rigorous standards in core content such as English, Math, Science and Social Studies measured by high school course requirements, high school point average and entrance examinations; cognitive strategies-problem formulation, research, collaboration and communication skills; meta-cognitive skills and techniques-persistence, self-awareness, motivation and help-seeking; transition knowledge-understanding norms and values,

applying for admission and financial aid; and earning college credit before entering college like advanced placement, dual enrolment and international baccalaureate. This research is evaluating only one component, the academic content knowledge, which by far is affected by the strand taken. Other components were not considered like the cognitive development, meta-cognitive skills, and transition knowledge.

From the results presented above, it can be seen that there is a vast difference in the academic performance of respondents coming from different strands. The strand taken possessed an impact in their academic performance in higher education. Upon entrance in a university, it is advisable to consider the learner's track so as to continue what they started during their senior high school. The skills developed by the students in the senior high school will be more enhanced if they will be nurtured as they pursue studying in the same aligned career. However, pursuing a track/career that is not related in the previously-taken track and strand will serve as a challenge for the learner to pursue. As the study showed, all the respondents complied with what the course demands though their taken track shared a significant difference in their academic performance.

The students' sense of belongingness relating to their involvement in students' activities with peers increased their educational pursuits (Martinez, 2016). This helped respondents to adjust on the challenges that they encountered. Hellen and Kitainge (2016) added that to perform well academically, it is necessary to attend lectures regularly. The optimistic view of the respondents in attending lectures always somehow helped themselves to comply with all requirements of the course.

The requirement of a bridging program may somehow help learners to cope with the changes they encountered in their path. Since higher education is tasked to give this bridging program, the teaching strategy and content will be a favorable aid to learners. However, as Dr. Biglete of OCSD - CHED mentioned, it is on the discretion of HEI whether a bridging program will be provided prior to acceptance in a not related program. In having this disposition, the objective of K to 12 Program of preparing the learner for tertiary learning will be sacrificed for those HEIs where bridging programs will not be conducted.

Conclusion

The study revealed that the K to 12 track taken by the first year BIT food Technology students had evident effect in their academic performance in Applied Chemistry. Those STEM strand students performed better than the TVL-HE strand while those in GAS strand performed least. Given that there are voluminous factors affecting what track to pursue, the alignment of the track is a must to be considered in order to fulfil its objective of college readiness of the learners. Alignment and collaboration can increase student success—in both reaching college and career readiness (DeMaria, *et al.*, 2015). Since DepEd and CHED have not come together in a shared vision, a more intense collaborative initiative between the higher education and K-12 sectors can be made to improve student academic outcomes and college readiness. The assessment landscape of two different sectors may be visited also in a way that the transition stage will not disrupt the college readiness of the learner.

To ensure college readiness of the learner, college readiness courses may be given in high school. Readiness courses are courses offered in high school and specifically designed to assist students who are not yet ready to proceed in college (DeMaria *et al.*, 2015). A needs assessment may be given first to determine the need prior to taking of the course. Lastly, a college gateway course can be designed to ensure smooth learners' transition from K-12 to

higher education without "watering down" college-level coursework. Higher educational institutions may assign faculty members who understand the benefits of higher expectations for K to 12 students and support the college readiness of the learners.

Conflicts of interest

There is no conflict of interest of any kind.

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