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PREDICTORS OF SUCCESS IN SCIENCE QUIZ COMPETITION

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ABSTRACT

This descriptive research sought answer to the main question, "How do various factors affect success in Science quiz competition in the Division of Bulacan?

Based on the problem, three hypotheses were formulated and tested: (1) student, teacher, and school- related factors, collectively, have significant effect on the performance/grade of the students in Science, (2) student, teacher, and school- related factors, collectively, have significant effect on coach preparation (combined teachers' competence, emotional intelligence, morale, and personality), and (3) student, teacher, and school related factors, collectively, have significant effect on the success in Science Quiz Competition (combined performance/grade of the students in Science and coach preparation).

The three sets of independents variables namely: student/participant-related factors, teacher/coach-related factors, and school-related factors were described with the use of frequencies, percentage, and means. Multiple regression analysis and analysis of variance were also used to analyze the results of the study.

The major findings of the study are: Collective Effects of Student, Teacher, and School-Related Factors on Performance/Grade of the Students in Science. Multiple Regression Analysis on the collective effects of student, teacher, and school-related factors to the performance/grade of the students in Science revealed that only teacher's teaching experience (a teacher-related factor) confers effect to the grades of the students in Science. Collective Effects of Student, Teacher, and School-Related Factors on Coach Preparation (competence, emotional intelligence, morale, and personality). Multiple Regression Analysis on the collective effects of student, teacher, and school-related factors on coach preparation (Competence, Emotional Intelligence, Morale, and Personality) confirms that there are three (3) factors that notably affect coach preparation. Under student factors, education of the father proved significant. Of all the teacher factors assessed, area of specialization was considerable. It is highly-significant to coach preparation. This illustrates that in order for a teacher to be an effective coach, he/she must have extensive teaching experience and expertise in the field of Science (as the quiz competition demands). Lastly, there is only one school factor that significantly affects coach preparation. It is the library resource. The negative beta coefficient under the said variable suggests that an increased number of library resource materials would result to a decrease in the need for a teacher-coach; hence, coach preparation is affected. Collective Effects of Student, Teacher, and School-Related Factors on the Combined Performance in Science and Coach Preparation (Success in Science Quiz Competition). The definitive effects show in the Multiple Regression Analysis of the Collective Effects of Student, Teacher, and School-Related Factors on the Success in Science Quiz Competition (Combined Performance/Grade in Science and Coach Preparation) in which two (2) factors had established significance. The area of specialization of the teacher-coach is highly-significant. It is not enough that the teacher-coach is an expert. More importantly, he/she should be an expert in the field of Science in order that he/she becomes more able to train, guide, and educate the student participant to succeed in Science quiz competitions. Finally, library resource is observed to be a significant school factor affecting success in Science quiz competitions; it is considered significant. Having a negative beta coefficient, it can be interpreted that as the library resources get lower, the higher the success in Science quiz competitions shall be.

I. INTRODUCTION

"Success is a statement of accomplishment and achievement resulting from an endeavor" (Webster International Dictionary).

Educators agree that the academic success of students provides an index of the quality of a school and its administrators. It is basically a school product. According to Airasian (1997) the goal of school administrators is to prove the effectiveness of each school's educational system. This is usually indicated by student performance that can be measured through students' success. They are also aware of the fact that the academic success of

the students, for example in a certain competition, is the index of their teaching ability and success. Although academic success is largely based on the efforts of individual students, other factors play a role as well. According to Danao (1991) it is also influenced by factors within the social system. One of the factors is the teachers. Exceptional teachers can provide students with maximum encouragement, motivation, challenges and belief in themselves. Students need to know that their teachers believe in them and that they are capable of academic success. Parental involvement is also extremely important to a student's academic success. Children spend most of their time at home and the environment a student comes from determines their start of academic success. Intrinsic motivation or self-motivation is another important element leading to school success. Self-motivation assumes that we are all born with the capability to learn and that learning can be an enjoyable process. Students who have a high self-esteem have a strong sense of self-motivation as they believe they are capable of academic success. Resources and variety of equipment and facilities offer by schools also aid a student's success. Schools update textbooks periodically, ensuring the accuracy of the information students are receiving. They also have other resources, such as computers and facility such as science laboratory to help students progress academically.

In the field of education competitions are beneficial. They are often viewed as the pursuit of trivial knowledge but they also encourage students to achieve academic excellence and increase their awareness of the world around them. A good competition challenges the participants to give their best, or preferably more than that. Science Fair is a good example. It develops scientific and technological efficiency among students and at the same time it is one of the competitions in which success of the participating schools especially public schools can be measured. These are the reasons why every Science month of the year the Department of Education (DepEd) and Department of Science and Technology (DOST) join efforts to encourage the elementary and secondary science classes through regional circulars and memoranda to participate in Science Fairs.

Though the highlight or main event in science fairs is the presentation of independent research this also includes other science-related contests such as science quizzes. Science quiz serves as a brief assessment used in education to measure growth of knowledge, abilities, and/or skills of the students in Science. It is usually scored in points and is designed to determine a winner from a group of participants - usually the participant with the highest score. Science quiz competitions, also serve to: (1) test students' accumulation and retention of knowledge in a real life situation, (2) encourage independent study and academic excellence, (3) recognize and appreciate non-traditional venues for competition, (4) build self-esteem and school pride, (5) empower students with a new understanding of what has been, what is now, and what can be, (6) provide opportunities for faculty, students, parents and the community to work together.

In the Division of Bulacan, more or less 70 students per year level from different schools participate yearly in Science Quiz Competition during Division Science Fair. The first year covers topics about General Science, second year about Biology, third year about General Chemistry and fourth year covers Physics. Many of the schools understandably aspire to be included in the top 10 performers in each division quiz competition. And this achievement is certainly given recognition and is sure to function as good advertisement and as promotional material for these schools. Moreover, winning participants are given monetary incentives and help add luster to the reputation of the schools they represent.

Schools, together with the science teachers/coaches and students/participants do their best to get to a good rank in science quiz competitions. They expend a great deal of resources for to achieve this. They also prepare as early as possible to get better chances. But despite that fact, it was observed that there is repeated occurrence of success in the said competition. Certain schools repeatedly end up at the top of Science quiz competitions while others lag behind. Some of the schools that constantly win in the division quiz competitions are San Miguel High School, Mariano Ponce National High School, Fortunato F. Halili Agricultural School, Guiguinto National Vocational High School, Carlos F. Gonzales High School, A.F.G.Bernardino Memorial High School, and Pulong Buhangin High School. It is important therefore that every attempt to find the factors that affect academic performance/success of students in quiz competitions be given attention.

In accordance with the aforementioned, the researcher used a set of independent variables to identify some factors affecting success in science quiz competitions. She hopes that this study can help other schools in screening and selecting students/ participants in quiz competitions, generate momentum towards making the preparations more challenging and interesting, and help make necessary actions in improving the delivery

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systems of the school, namely: the teaching staff especially the science teachers, school laboratory facilities, and equipment.

Statement of the Problem

The general problem of the study is: How do various factors affect success in Science quiz competition in the Division of Bulacan?

Specifically, the study sought answers to the following questions:

1. How may the winning student/participant, teacher/coach, and school-related factors be described in terms of:

1.1 Student/Participant Related Factors
1.1.1 gender;
1.1.2 age;
1.1.3 size of the family;
1.1.4 education of parents;
1.1.5 occupation of parents;
1.1.6 family income;
1.1.7 number of times joining any quiz competition;
1.1.8 study habits;
1.1.9 attitude in science;
1.1.10 self-efficacy;
1.1.11 locus of control;

1.2 Teacher/Coach Related Factors
1.2.1 teaching experience;
1.2.2 educational attainment;
1.2.3 area of specialization;
1.2.4 relevant seminars attended;
1.2.5 number of hours of training/review conducted (per week);

1.3 School Related Factors
1.2.6 class size;
1.2.7 library resource;
1.2.8 laboratory facilities; and
1.2.9 laboratory equipment?

2. What is the level of success in terms of:

2.1 Performance of students in Science
2.1.1 grade in Science;

2.2 Coach preparation
2.1.2 competence;
2.1.3 emotional intelligence;
2.1.4 morale; and
2.1.5 personality?

3. How do student, teacher, and school-related factors, collectively affect success in Science quiz competition?

Scope and Delimitations of the Study

This study focuses on the selected winning students, their teachers, and school-related factors that are assumed to determine success in the Science quiz competitions. The student factors include gender, age, size of the family, education of parents, occupation of parents, family income, number of times joining any quiz competition, study habits, attitude in science, self-efficacy, and locus of control. The teacher/coach- related factors comprise of their teaching experience, educational attainment, area of specialization, relevant seminars attended, and number of hours of training or review conducted (per week). The predetermined school related factors are class size, library resource, laboratory facilities, and laboratory equipment. The respondents of this study are limited to students/participants and coaches (first year to fourth year) who successfully ranked 1-10 in the Division Science Quiz Competitions in 2009, 2010, and 2011 Science Fairs. The school they represented had at least two wins within the given dates. Success in Science Quiz Competitions is based on their

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performance/grade in Science and from the coach preparations. The success of the coaches is measured in terms of their competence, emotional intelligence, morale, and personality. This is based on their answers to the questionnaires given to them supported by unstructured interviews to get in-depth information to the teacher/coach respondents.

Statistical tools in analyzing the gathered data are limited to frequency, count, total, percentage, weighted mean, multiple regression analysis, and analysis of variance.

II. METHODOLOGY

This chapter discusses the methods and techniques of the study, the population and sample, the research instrument, the data gathering procedure and data processing and statistical treatment.

Methods and Techniques of the Study

This study utilized the descriptive method of research where Multiple Regression Analysis in anchored upon. As defined by Good and Scates (1972), the descriptive method is: "Descriptive research includes studies that refer to present facts that are going on and also the nature and status of anything. It gives meaning to the quality a significance of situations, beliefs, and attitudes through an in depth analysis of facts gathered".

According to Best and Kahn (1989), descriptive research describes and interprets what is. It is concerned with conditions of relationship that exist; practices that prevail; beliefs; processes that are going on; effects that are being felt, or trends that are developing.

The researcher looked into the effects of the student, teacher and school-related factors on the success in Science Quiz Competition. The researcher used questionnaires as the primary source of gathering data. Likewise, an unstructured interview was employed to teacher/coach respondents to support the data gathered from the questionnaires and to have an in- depth information on their preparation for the science quiz competition.

The questionnaires for the students and the school-related factors were answered by the students who participated and ranked in the Division Science Fair- Science Quiz Competitions. The questions concerning teacher-related factors, on the other hand, were answered by their corresponding science teacher/coach.

Personal administration of the survey instrument, ocular inspection, document analysis, and random, unstructured interviews were employed to clarify and authenticate the data collected.

Population and Sample of the Study

The subject of the study were the first year to fourth year students who won or ranked in the Division Science Fair- Quiz Competition year 2009, 2010, 2011 and the corresponding Science teacher/coach/trainer of public schools in Division of Bulacan.

Presented in the table are the numbers of respondents-schools, student respondents, and teacher respondents from EDDIS I-IV. The researcher focused on the said schools since they were the winning schools in the Division Science Fair - Quiz Competitions years 2009, 2010, and 2011.

Research Instruments

This research relied heavily on questionnaires as the primary source of gathering data. The study used two sets of questionnaires: one for the students and the other one for the teachers.

The questionnaire for the students includes their gender, age, size of the family, education of parents, occupation of parents, family income, number of times joining any quiz competition, study habits, attitude towards science, self-efficacy, and locus of control as factors that could affect success in science quiz competition. The study habits' questionnaire by Potenciano, Mulato and Amodia (2005) was used to measure the students'/participants' study habits while The Science Attitude Survey used by Milagroso (1998) was used to measure the students'/participants' attitude towards science. This Science Attitude Survey was developed from paragraph describing attitudes towards science and consisting of 10 items which connoted positive attitudes and 10 negative attitudes. The self-efficacy questionnaires used by Iligan (1999) in her study were adopted to measure the self-efficacy or the perceived attitude of the students towards their studies. Lastly, to measure the locus of control of the students the questionnaires used by Balete (2006) in his study were also used.

Teacher/coach profile or related factors such as teaching experience, educational attainment, area of specialization, relevant seminars attended, and number of hours of training or review conducted (per week)

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were answered by the teachers themselves. To measure their level of competence, emotional intelligence, morale, and personality, questionnaires used in Ballesteros' (2006) study were be given to them.

As much as instruments in Ballesteros' (2006) study are standardized tests, they possess construct validity adequate for research purposes. However, some modifications were made to ensure that the items will be fitted to science coaches/teachers.

The questionnaires of the adequacy of facilities and adequacy of laboratory equipment are based on the lists of the standard facilities and equipment for the Science and Technology (DECS Order no.88 series of 1988) and used by De Guzman (2008) in his study, "Management of Science Laboratories and Resources of Selected Public Secondary Schools in Bulacan".

Data Gathering Procedure

The researcher obtained the list of winners in Division Science Fair – Quiz Competition through Division Memorandum issued every year by the Division Science Supervisor.

Data Processing and Statistical Treatment

The researcher individually gathered and tabulated the data to ensure its reliability and accuracy. A coding system was devised and coded values were assigned to the variables.

The following statistical tools were used to analyze the study:

- Frequency, percentage and mean were used to determine and analyze the profile of the students, teachers, and school.
- Multiple regression analysis and analysis of variance were used to determine the effects of the student,

The type of regression used is the standard method of entry which is simultaneous (a.k.a. the enter method); all variables are entered into the equation at the same time. This is an appropriate analysis when dealing with a small set of predictors and when the researcher does not know which variables will create the best prediction equation. Each predictor is assessed as though it were entered after all the other independent variables were entered, and assessed by what it offers to the prediction of the dependent variable that is different from the predictions offered by the other variables entered into the model.

The success in Science quiz competition was computed by adding the point of the students in their grade in Science and the average mean of the coach preparation in terms of competence, emotional intelligence, morale, and personality

III. MODELING AND ANALYSIS

Conceptual Framework

The independent variables studied included student, teacher, and school-related factors, and the dependent variable was the success in Science quiz competition. These elements and the nature of their relationship were assumed to interact with each other. Thus, this study considered the relationship of student, teacher, and school-related factors jointly, viz a viz success in science quiz competition.

This study posits a model that expresses a predictive relationship between performance of the students and teachers in Science quiz competition and several variables which were identified in various literatures as probable determinants of performance or achievement.

The first frame (left hand box) contains the independent variables hypothesized to have a significant effect on the success in Science quiz competition. These are student/participant-related factors, teacher/coach-related factors, and school-related factors. The student/participant-related factors include the gender, age, size of the family, education of parents, occupation of parents, family income, number of times joining any quiz competition, study habits, attitude in science, self-efficacy, and locus of control. The teacher/coach-related factors consisting of teaching experience, educational attainment, area of specialization, relevant seminars attended, and number of hours of training/review conducted (per week). The school-related factors cover the class size, library resource, laboratory facilities, and laboratory equipment.

The second frame (right hand box) is the dependent variable in this study, success in science quiz competition, which is measured in terms of the performance/grade of the winning students in Science and their coach preparation based on competence, emotional intelligence, morale, and personality.

Independent Variables Dependent Variables

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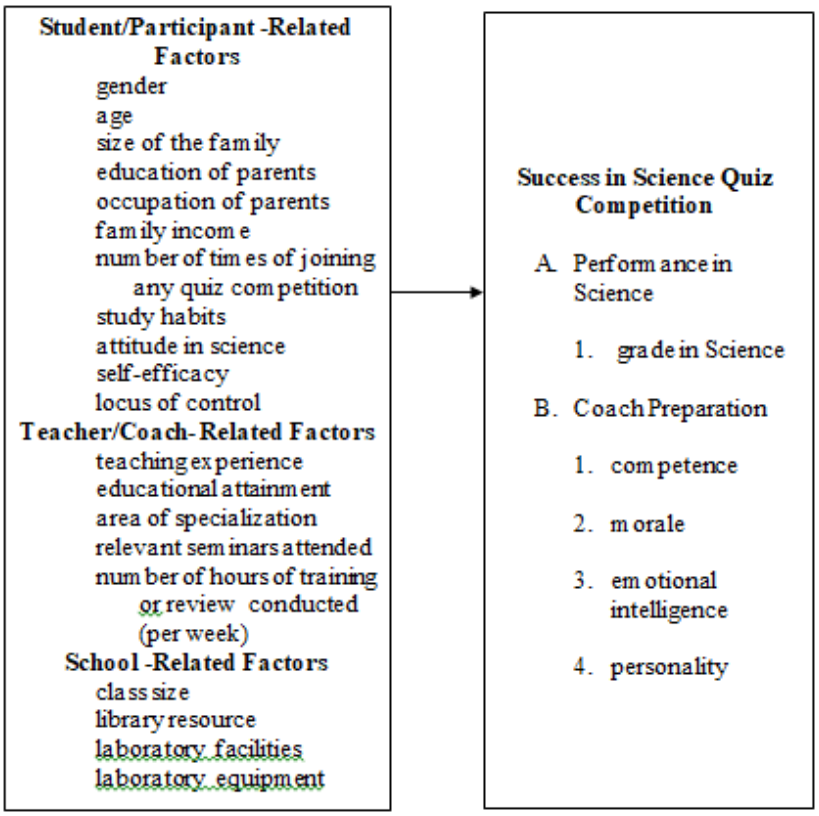

Fig. 1 Paradigm of the Study

The arrow connecting the independent and dependent variables is the hypothesized effect of the student/participant-related factors, teacher/coach-related factors, and school-related factors on the success in science quiz competition in terms of performance/grade in Science and coach preparation.

IV. RESULTS AND DISCUSSION

Student/Participant-Related Factors

The succeeding tables present the student-related factors in terms of gender, age, size of the family, education of parents, occupation of parents, family income, number of times joining any quiz competition, study habits, attitude in science, self-efficacy, and locus of control.

Gender. As presented in the table, from the 93-respondents, 31 respondents or 33.33% are female while 62 respondents or 66.67% are male. In this study, majority of the respondents are male. Doepken, Lawsky and Padwa as cited by Galura (2009) found that males have more confidence in the subject matter of Science than females. In addition, females perceived Science as a male domain more than males did.

Age. In the same table, the range of the age of the winning students/participants respondents in Science quiz competition is from 9-11 years old to 15-17 years old arranging it from lowest to highest. Only 2 students age 9-11 years old. This implies that only 2 of them are very young and started schooling at a very early age that's why at this age they are already high school students. It can also be gleaned from the table that 62 of the students age 12-14 years old. This tends to be a period when people can see a bigger picture and understand complex issues and topics more thoroughly than they could when they were younger. They are also starting to move from concrete to abstract thinking; can understand cause and effect. They are moving from fantasy to realistic focus on their life's goals; can understand cause and effect.(Mentoring Partnership). The rest were 15-17 years old when they joined Science Quiz Competitions.

Size of the family. A closer look at the table shows that 39.78% of the respondents have a small family consisting of 3-5 members only. Majority or 50.54% of the students belong to the families with of 6-8 members while 5.38% belong to families of 9-11 members. There are 4 families though, that belong to the big families of 12-20 members, which is equivalent to 4.31% of the sample.

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Educational attainment of Parents. Fathers have finished high school and they are about 29.03% of the total respondents. 6.45 % were vocational graduates, 23.66% graduated college, 15.05% did not finish college, 6.45% did not finish both their elementary and secondary school course while 6.45% finished their primary schooling. Only 1.08% has units in Masters, 4.30% are master's degree holders, and only 1.08% are doctorate degree holders.

Also seen in the table is the educational attainment of the mothers. The data reveal that majority of the student-respondents' mothers (31.18%) are high school graduates. Not one has a mother with units in doctorate degree or doctorate degree holder. 4.30% were unable to finished primary, 11.83% did not finish secondary, and 11.83% did not complete tertiary education. 6.45% of the mothers have units in master's degree and are master's degree holders. Only 4.30% were vocational graduates.

Occupation of parents. Table 2 shows that 5 of the fathers' and 18 of the mothers' respondents are government employee; 19 fathers and 13 mothers are private employee; 5 are businessmen while 6 are businesswomen; 7 fathers and 3 mothers are working abroad as contract workers. Most of the fathers are laborer while most of the mothers do not have occupation. This implies that most of the students have fathers who are simple workers while mothers, have not deviated from the traditional role of homemaking, rearing children, and managing the household.

Annual family income. Based on the data gathered, shown in the table 18.28% of the respondents belong to the ₱36 000 and below bracket families. 6.45% earning ₱36 001 - 48 000, 9.68% receive from ₱48 001- 60 000 a year, 1.08%, 2.15%, 9.68%, 5.38%, and 6.45% families earn ₱60 001 - 72 000, ₱72 001 - 84 000, ₱84 001 – 96 000, ₱96 001 – 108 000, and ₱108 001 – 120 000 annually. It can be gleaned from the same table that most of the parents' average annual income falls on the range of above ₱120 000. This means that majority of the student-respondents belong to the family who has high earning. This is possible because some of the mothers nowadays are also working. Sometimes they earn more than their husbands thus resulting to a higher earning.

Number of times joining any quiz competition. The table also shows that 9 out of the 93-respondents never experienced joining any quiz competition before winning science quiz competition. This implies that they are newly contestants. 19 students experienced 6-10 times, 6 have experienced 11-15 times while only 3 respondents have joined 16-20 quiz competitions before winning the said quiz. 56 students have experienced 1-5 times of joining. This implies that majority are not new to the system, they are "more experienced", more or less they have already ideas on how a science quiz competition goes on and are better prepared.

Study habits. Table 3 presents the frequency and descriptive measures of the students' study habits. In this study, the study habits of the students was described as very good, good, fair, poor and very poor.

It can be gleaned that the study habits of the student-respondents obtained an average mean value of 3.78. This means that the students have Good study habits. Capino (1999) posits that forming good study habits is essential to success in school work. The success or failure of a student depends largely on his study habits which rely on his capacity and capability of the teachers to facilitate the information of sound study habits. By doing so, the students are able to overcome and improve their weakness especially those which relate their study habits to improve the status of their academic performance.

It also shows that the students reading with comprehension with the lesson registered the highest mean value of 4.43 interpreted as Good. It may be posited that the students can concentrate/comprehend more in their lessons. This is supported by item 1 - studying with the group where atmosphere of sharing ideas prevail which registered the lowest mean value of 3.22 which is interpreted as Fair. This means that they learn more while studying alone or on their own.

Attitudes Towards Science. Table 4 presents the frequency and descriptive measures of the students' attitude in Science.

As seen in the table, the students' attitudes towards the subject registered an average mean of 4.57 interpreted as Very Positive. This implies that for them Science is really important, helpful, practical, and a good subject. This is really a subject with value to them as registered by the highest average mean of 4.96 interpreted as Very Positive. This is supported by De Guzman's study, as cited by Reyes (2001), which revealed that the students have favorable attitudes toward science. High school students found Science interesting, very important,

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valuable and useful to their everyday life. They also believed that science trains them to become objective, critical and analytical. Learning science was thought to be fun, very complex, and with too many activities. But it doesn't mean that this is always their first priority. Item number 1, No matter what other work I have in school I put Science first, obtained the lowest average mean of 3.67 interpreted as Positive.

*reverse scoring

The data reveals that students' self-efficacy obtained an average mean of 2.47 which is interpreted as High Self-Efficacy. People with high self-efficacy tend to exert greater effort when faced with a challenge, which in turn increases the chances of success in dealing with it. Self-efficacy can help promote success in meeting the challenges of life. When people are convinced that they can indeed meet challenges, the resulting sense of self-efficacy will most likely place them in a cycle of success (Feldman, 1989). Higher perceived self-efficacy leads to effort and persistence at a task.

Students registered low self-efficacy in terms of understanding a lesson at school because of not listening carefully with a mean of 1.54. Students with low self-efficacy give up more easily in their academic pursuits than students with high self-efficacy. Low self-efficacy produces discouragement and giving up (Bandura, 1989b).

Locus of Control. Table 6 presents the frequency and descriptive measures of the students' locus of control. Based on the data gathered, the students' locus of control got an average mean of 2.73 interpreted as moderate internal. This means that they have control over the outcome of their actions or works. They most likely attribute their high achievements to studying hard rather than chanceful incidents (Burger, 2005). Internal locus of control is associated with high level of motivation. For the externals, the causes for events are located outside themselves. They believe that they have little control over the outcome and fail to perceive a cause-and –effect relationship between action and consequences. They have lesser motivation to work hard (Parsons, et al., 2001).

Teacher/Coach-Related Factors

The teaching experience, educational attainment, area of specialization, seminars attended, and number of hours review/training (per week) are teacher/coach-related factors included in the study.

Table 7 displays the frequency and percentage of the teacher/coach-related factors.

Teaching Experience. A closer look at the table shows that 10 or comprising the 10.75% and 29 or comprising the 31.18% of the teachers/coaches has been in the teaching profession for 1-5 years and 6-10 years respectively. On the other hand, 23 or comprising the 24.73% are engage in teaching for 11-15 years while 18 or comprising the 19.35% are for 16-20 years. Furthermore, 11 or comprising the 11.83% have been teaching for 21-25 year. Lastly, only 2 or comprising the 2.15% of the teachers with 21-25 years experience are still eager to train students for the science quiz competition. It can be inferred that most coaches are new to the service. This may be explained that old or more experienced teachers give way for them to train quiz bee participants.

Educational Attainment. Perusal of the data in Table 7 revealed that out of 93-teacher-respondents, 31 are Bachelor degree holder while 27 are Masters degree holder. Furthermore, the data shows that no one has achieved doctorate degree although 35 are currently working on their post graduate studies.

The data revealed that majority of the coaches upgrade themselves by taking graduate courses. This implied that they are interested in the welfare of their students and also in their own career. The findings also implied that the teachers strive to keep pace with the challenging world of technology and to improve their teaching skills and one way to be updated and to be kept abreast of the modern trends of teaching is to study with one end- view to improve performance.

Area of Specialization. The data exposed that among the teacher/coach respondents, there are 33 (35.48%), 24 (25.81%), 22 (23.66%) and 14 (15.05%) are major or have specialized in General Science, Biology, Chemistry and Physics respectively. Rozycki (1999) commented that those who desire a change must be concerned to develop expertise in the field of their specialization.

Seminars Attended. The teachers' profile in terms of seminars attended whether on district, division, regional or national level is also reflected in table 2. This shows that 18 out of the 93-respondent-teachers earned 21-40 hours of relevant seminars. 2 teachers have attended 41-60 hours, 8 teachers have 61-80 hours while 11 coaches earned 81-100 hours. 48 of the respondents have earned more than 100 hours of seminars. Analysis of

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the data manifested that most skills development is very important and the senior managers (the principals in school setting) have the duty to foster development of others and themselves. Division skills are learned for traditional INSET activities and personal development goes hand-in-hand with school development (McMahon:1990). From this, it can also be inferred that the government is really interested to the professional upliftment of the teachers and also to their student thus allotting budget for seminars.

Hours Review/Training. As can be seen on the table 37.63% of the teacher-respondents conducted 1-5 hours of review or training per week while 44.09% have 6-10 hours of review. 11.83% and 6.45% spent 11-15 and 16-20 hours of review per week respectively. This implies that majority conducted review 2 hours or less per day. They are determined to win that's why aside from regular class hours and busy schedule they also allotted time for review session.

School-Related Factors

The class size, library resource, laboratory facility, and laboratory equipment comprise the school-related factors included in the study.

Table 8 exhibits the frequency and percentage of the school-related factors.

Class size. The data in the table reveals that the students per class in the respondent-public schools range from 36 to more than 70 students which are beyond the ideal number of students which is 35. The data further reveals that majority from 93 teacher- respondents have 56-60 students, 17 with 61-65 students, 15 with 46-50 students, 14 with 41-45 students, 13 with 51-55 students. Moreover, 6 classes have 66-70 students per class and 5 classes have more than 70 students. Only 1 has the lowest number of students of 36-40 students. This implies that majority of the classes are overcrowded and hence, should be given extra attention.

Library resource. As seen in the table, 10 of the student-respondents answered that their school does not have a library. 21 said that they have adequate source in the library which includes textbooks and reference books. Majority perceived their school as very adequate in library resource which include, aside from textbooks and reference books, other materials such as subscriptions of magazines or journals and local or foreign materials.

Characteristically, a good high school identifies with the institutions library. The measure of excellence is the extent to which its resources, services and facilities support the institutions objectives. The function of the library may be summarized as follows: (1) the library as a teaching instrument, (2) the library as a stimulus to individual intellectual development, and (3) the library as an essential contribution to a well-rounded liberal education.

Laboratory facility. The same table still reflects the distribution of students who answered regarding their laboratory facility. 20 of them answered that they don't have laboratory facility at school while 73 student-respondents answered that they have laboratory facility at school. According to Birrey (2010), Science laboratory of the school is essential factor to the learning performance of the students in science. It is a place where practical work approach can take place. The present trends in science education need some supplemental way that can serve as bridge for a better performance of the students.

Laboratory equipment. From the table, it can be gleaned that 50.54% of the respondents perceived their laboratory equipment at school as moderately adequate or having 11-20 kinds of laboratory equipment at school while 11.83% of the respondents perceived it as adequate (21-30 kinds of laboratory equipment) and 32.26% answered that they have very adequate laboratory equipment31-40 kinds). Only 1.08% said that there is no laboratory equipment in their school and 4.30% perceived their laboratory equipment as inadequate (1-10 kinds only). Though majority has moderately adequate laboratory equipment, the problem is that the number/quantity of the laboratory equipment is insufficient for classes with more than 30 students. The lack of Science laboratories and equipment in most public secondary schools especially in rural areas was reported in the 2000 Philippine Agenda for Educational Reform. These were seen by the absence of laboratory work after class discussion. Science teaching has also become a simple chalk and board fact teaching. Thus the Science program lacks the necessary equipment for student activities and experiments. The students find it very complicated even handling simple laboratory apparatus when they take up a course which requires laboratory work. Also, they lack the skills in performing appropriate laboratory experiment.

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Such condition hinders the production of efficient and effective citizen in the field of Science and Technology.

Level of Success in Science Quiz Competition in Terms of Performance/Grade in Science and Coach Preparation.

Performance of the students in terms of grades in Science and the coach preparation in terms of competence, emotional intelligence, morale, and personality are the measure of success in Science quiz competition included in this study. Table 9 reveals the level of success in Science quiz competition in terms of performance rating in Science and coach preparation.

As can be gleaned from the table the performance/grades of the students in Science for the first grading period are either high or average. This is expected because during the first quarter of the school year, most teachers have a fixed ceiling grade. The reason is that teachers tend to offer their students three more grading periods to improve their grades. Pioquid (2006) cited in her study that perhaps the most traditional method of measuring student success is grades. Grades measure how well the students complete work and how well they have mastered the material. These also serve as the bases of school performance and means of providing feedback about the students' achievement.

The table also shows the average mean the teachers obtained in coach preparation such as "**Competence**, at 4.02, is interpreted as Highly Competent". According to Arceo (2000), a competent teacher is one who has honed his skills in the art of teaching. She/he demonstrates proficiency in the use of language, adapts varied teaching strategies, recognizes changes, applies innovations, revises techniques for optimum results, and allows her/his self to be guided by acknowledged principles and theories in education. "**Emotional Intelligence** is 4.34 which means that they have Moderate emotional intelligence." Emotionally intelligent teachers are active in their orientation to their students, their work, and their lives. They are resilient in responding to stress and are less likely to overwhelm themselves with pessimism and strong, negative emotions. "They are also High in **Morale** at 4.36." Findings of Anderson as cited by Bayawa (2002) showed that teachers in secondary schools whose pupils achieve relatively high scholastically appear to have a higher morale than teachers in schools with relatively low pupil achievement. The morale of teachers, according to Anderson, makes a difference in the scholastic achievements of their pupils. Apparently, teachers with relatively high morale can be expected to teach more effectively. Thus, the quality of instruction and guidance which the young people receive depends to some extent upon the morale of the persons doing the teaching. "Lastly, teachers' **Personality** registered an average mean of 4.34 which is construed as Desirable." Manzano (2000) stated that "teacher characteristics" are essential in successful teaching. The direct correlation between "teacher personality" and successful teaching has already been established and proven through numerous researches. This is one area therefore according to her that school administrators or people in school organizations directly involved in human resource development could ill-afford to ignore.

Combining the points of the students in grades and the mean of the coach will result to the success in Science quiz competitions which is measured by a certain set of rubrics and are categorized into different levels: very high, high, or average. It can be gathered from the table that most of the success achieved is high and only one got an average success.

Summary of the Multiple Regression Analysis

Table 10 presents the multiple regression analysis of the collective effects of student, teacher, and school-related factors on performance/grade of the students in Science.

Table 1: Multiple Regression Analysis of the Collective Effects of Student, Teacher, and School-Related Factors on the Performance/Grade of the Students in Science

Variables	Beta	T-value	P-value
Student Factors			
Gender	-0.105684	-0.180	0.8579
Age	0.244673	1.099	0.2755
Size of the family	0.045241	0.416	0.6790

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Education of the father	-0.050034	-0.258	0.7968
Education of the mother	0.093807	0.432	0.6670
Occupation of the father	0.014261	0.118	0.9064
Occupation of the mother	-0.037158	-0.306	0.7608
Family income	0.100373	0.980	0.3306
No. of times joining (any quiz competition)	0.038018	0.529	0.5984
Study habits	0.653005	0.809	0.4212
Attitude	0.083303	0.068	0.9463
Self-efficacy	-1.790455	-1.085	0.2816
Locus of control	-0.153195	-0.119	0.9055
Teacher Factors			
Teaching Experience	-0.094734	-1.689	**0.0956***
Educational attainment	0.301884	0.911	0.3656
Area of specialization	0.211145	0.732	0.4664
Seminars attended (hours)	0.004048	1.325	0.1896
Hours of review/training (per week)	-0.351237	-1.055	0.2952
School Factors			
Class size	-0.028721	-0.773	0.4419
Library resource	-0.091918	-0.335	0.7387
Laboratory facility	0.273153	0.324	0.7467
Laboratory equipment	-0.263867	-0.841	0.4030
R^2 = 0.1775	**F value = 0.6868**		**Sig F = 0.8373**

*, p < 0.10: significant

As can be seen from the table Sig F of 0.8373 is greater than 0.10 level of significance so this dictates that the hypothesis is not rejected. This means that there is no sufficient evidence to say that collective student, teacher, and school-related factors and performance/grade in Science of winning students in Science quiz competitions have significant relationship. This may be attributed to variable homogeneity and non-variance of the samples' responses (since all of them belong to the cream of the crop in their respective schools). Naturally, schools send only the best among their students in prestigious competitions such as Science quiz competitions. The prime reason why there appears to be no significant correlation between the grades of the students and the student, teacher, and school related factors is because all the respondents already excel in the field of Science. The grades/performances of all the respondents in their Science subjects are naturally high. Considering that grades measure how well the student completes work and if they show mastery of the material, it is therefore deemed necessary that further studies be conducted on this matter, taking into consideration respondents who have moderate performance/grades in Science.

The data on Table 11 depicts the independent variables and their combined effects on coach preparation. Sig-F registered at 0.03897 which means that coach preparation is highly significant to obtaining favorable results in Science quiz competitions. This was also revealed by Albania (2003), citing Tajon, when he claimed that the teacher's experience is correlated significantly with the students' achievement. Consequently, the performance rating of a student may very much likely depend on how well-equipped his/her coach/teacher is.

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Table 2: Multiple Regression Analysis of the Collective Effects of Student, Teacher, and School-Related Factors on Coach Preparation (Competence, Emotional Intelligence, Morale, and Personality)

Variables	Beta	T-value	P-value
Student Factors			
Gender	0.0082922	0.103	0.91808
Age	-0.0003128	-0.010	0.99182
Size of the family	0.0134704	0.906	0.36818
Education of the father	0.0565398	2.138	**0.03600 ***
Education of the mother	-0.0011726	-0.040	0.96857
Occupation of the father	0.0087635	0.531	0.59737
Occupation of the mother	-0.0119800	-0.721	0.47320
Family income	-0.0269492	-1.925	0.05824
No. of times joining (any quiz competition)	0.0046869	0.477	0.63454
Study habits	0.1483719	1.346	0.18277
Attitude	-0.0728028	-0.432	0.66699
Self-efficacy	-0.0252898	-0.112	0.91098
Locus of control	-0.3349899	-1.907	0.0606
Teacher Factors			
Teaching Experience	0.0136558	1.783	0.07899
Educational attainment	0.0350667	0.774	0.44131
Area of specialization	0.1238073	3.143	**0.00245 ****
Seminars attended (hours)	-0.0002021	-0.484	0.62980
Hours of review/training (per week)	0.0287122	0.631	0.52998
School factors			
Class size	-0.0072193	-1.423	0.15919
Library resource	-0.0773095	-2.062	**0.04289 ***
Laboratory facility	-0.0560449	-0.487	0.62775
Laboratory equipment	0.0123729	0.289	0.77360
R^2 = 0.3564	**F value = 1.762**		**Sig F = 0.03897**

**, $p < 0.01$: highly significant and *, $p < 0.05$: significant

Of the 22 variables considered, only the education of the father under student factors appeared to have effect on coach preparation. Education of the father has a p-value of 0.03600, interpreted as significant, which means that the students' male parents should be intellectual as it affects their child's performance in Science either biologically or behaviorally. Under teacher-related factors, area of specialization is highly significant with p-value 0.00245, indicating that teachers who have mastery, or expertise on the subject matter (Science in this case) are able to share more knowledge. On the other hand, library resource was the only variable under school-related factors which has significant effects on coach preparation, it is considered significant with p-value of 0.04289. Teachers, more specifically teacher-coaches need learning tools and materials. It is by these functions that the library becomes a stimulus to individual intellectual development, as Ferrera (1999)

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explained in a study. These 3 variables combined accounted for the total great significance of independent variables on coach preparation (competence, emotional intelligence, morale, and personality).

The area of specialization ranked the highest from among the variables in terms of degree of effect, exhibiting a positive beta coefficient of 0.1238073. This means that the higher the hierarchy of the area of specialization is, the higher the coach preparation will be (competence, emotional intelligence, morale, and personality). For example, if the area of specialization is increased by 1 unit and other variables are held constant, coach preparation increases by 0.123. Tumambini as cited by Fontanosa (2001) said that when a teacher handles a subject of which he majors, naturally, the teacher concerned can teach competently since he has a wide understanding of the academic elements of the subject.

The education of the father also proved of influence on the coach preparation. The positive relationship shown by the beta coefficient of 0.0565398 depicts that the higher the educational attainment of the students' father, the higher the coach preparation. In the study of Espiritu (2011) he cited that parents' educational attainment influences the growth and development of their children. Parents' capability to educate their children on the different aspects of development is equated to their level of schooling, such that highly-educated parents can impart more knowledge to their children. According to Hill, as cited by Butil (2002), it cannot be denied that if parents' educational attainment is high, there is a greater tendency that their children will be challenged to do what their parents had attained in terms of education. This implies that once students' knowledge broadened and attained academic success as influenced by their fathers' educational attainment this will further increase the teacher/coach preparation.

An interpretation to this was confounded on the educational attainment of the student-trainee. Espiritu (2011) and Butil (2002) made mention of the consequential effects of the father's education to the student's educational development. If the educational level of the student-trainee is high, then a much higher level of expertise is expected from the teacher-coach, in Science at least. The duty of the teacher-coach is to provide the knowledge, skills, attitude, and preparatory training necessitated by the quiz competition. Since it was already proven in the two aforementioned studies that the student's education, our "confounder", is affected by their parents' (particularly the father's) education, it becomes palpable that the level of the father's education (parallel to the student's education) significantly affects the coach preparation.

The library resource obtained negative beta coefficient of 0.0773095 which means that as this variable decreased by one unit while other variables are held constant, coach preparation increases by 0.077. This means that teachers'/coaches' preparation was really tested especially during those times when the resources in the library are not adequate or are obsolete. These are the time whe their competence, emotional intelligence, morale, and personality were stretched farther to become winners in the Science quiz competition.

Also shown in Table 11 is the magnitude of the R square of 0.3564, which depicts that 6% of the variance of coach preparation (competence, emotional intelligence, morale, and personality) can be accounted for the combination of the independent variables' effects.

The Sig F-value of the combined variables, 0.03897 which is within the < .05 level of significance, made the independent variables (student/participant, teacher/coach, and school related factors) a potent predictors of coach preparation (competence, emotional intelligence, morale, and personality). Therefore the hypothesis that "collectively, the student, teacher, and school-related factors have significant effect on coach preparation" is hereby not rejected.

Table 12 is a tabular summary of the regression analysis of the collective effects of independent variables, namely, student/participant, teacher/coach, and school-related factors on the success in Science quiz competition (combined performance/grade of the students in Science and coach preparation).

Table 3: Multiple Regression Analysis of the Collective Effects of Student, Teacher, and School-Related Factors on the Success in Science Quiz Competition (Combined Performance/Grade in Science and Coach Preparation)

Variables	Beta	T-value	P-value
Student Factors			
Gender	-0.0800446	-0.508	0.613167
Age	0.0171228	0.287	0.774977

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Size of the family	0.0130387	0.447	0.656379
Education of the father	0.0310521	0.598	0.551459
Education of the mother	0.0224000	0.385	0.701448
Occupation of the father	0.0099450	0.307	0.759839
Occupation of the mother	-0.0323984	-0.994	0.323643
Family income	-0.0111179	-0.405	0.686834
No. of times joining (any quiz competition)	0.0217757	1.131	0.262109
Study habits	0.3245018	1.500	0.138131
Attitude	0.1276419	0.386	0.700581
Self-efficacy	-0.6324698	-1.430	0.157125
Locus of control	-0.4054725	-1.177	0.243378
Teacher Factors			
Teaching Experience	0.0127630	0.849	0.398716
Educational attainment	0.1770628	1.993	0.050181
Area of specialization	0.2469213	3.195	**0.002097****
Seminars attended (hours)	0.0005599	0.684	0.496462
Hours of review/training (per week)	-0.0091450	-0.102	0.918686
School Factors			
Class size	-0.0153671	-1.544	0.127163
Library resource	-0.1551969	-2.110	**0.038430***
Laboratory facility	-0.0818360	-0.362	0.718100
Laboratory equipment	-0.0352465	-0.419	0.676304
R^2 = 0.3532	**F value = 1.738**		**Sig F = 0.04272**

**, $p < 0.01$: highly significant

and *, $p < 0.05$: significant

Numerical data in the table reveals that only 2 out of 22 independent variables recorded significant effect on the success in Science quiz competition; and these are area of specialization (teacher/coach factor) and library resource (school factor). These variables influenced the success in Science quiz competition as indicated by p-values lower than 0.01 and 0.05 level of significance.

The area of specialization influenced success in Science quiz competition the most. P-value of 0.002097 and positive beta coefficient of 0.2469213 makes it highly significant and the best predictor of success in science quiz competition. The beta coefficient indicates that for every unit increase in the area/hierarchy of specialization of the teacher/coach while other variables are constant, will lead to 0.25 increased on the success in Science Quiz competition.

In education, specialization is the restricting or focusing of one's activity or one's course in a specific area of learning to ensure mastery of certain knowledge, skills, values, and attitudes for specific purpose (Ebonite, 2006).

Rozycki (1999), commented that those who desire a change must be concerned to develop expertise in the field of their specialization. This is supported by Taha as cited by Mallari (2001), mentioned that teachers with major or area of specialization could teach better. They could teach better their students. Hence, they got higher performance rating. Anderson as cited by Banate (2008) also found out that teachers effectively taught

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their subject matter compared to those non-majors. Salinas as cited by Sutara (2000) found out that teachers who were made to teach subjects which were outside their training did not perform well.

This is similar to Cruz's (2010) statement that according to him it is a common belief that teachers are more effective mentors of the learning process when they teach subjects in line with their area of expertise and if they possess the necessary experience to actively perform their duties and responsibilities.

A teacher must know the subject matter to be taught at a more sophisticated level then the students. Ideally, whatever the reasons for teaching school science (to produce future scientists or future citizens), this means that, in terms of science content teachers should know (1) the facts and concepts to be taught, and why these facts lead to a formulation of accepted models and theories; (2) how these facts and concepts relate to other important ideas in a given science, as well as to the 'big" ideas in other sciences; (3) which facts and concepts are the most important in science; (4) how knowledge becomes "science" knowledge, and how "accepted" science may be modified based on new data; (5) the laboratory skills necessary to accumulate such data; and, (6) that science is a human construct, developing over time to explain both the universe and the near environment in which we live. (Ware, 1992).

The library resource also proved of significance to success in Science quiz competition. The negative relationship shown by the beta coefficient of 0.1551969 depicts that the lower the library resource, the higher the success. If library resource is decreased by one unit while other variables are held constant, success in science quiz competition increases by 0.16. When resources in the library are not adequate or are obsolete, this is the time that the coach will be obligated to do his best to look for other sources/means to produce reviewers which will be of greater help in winning the Science quiz competitions. The teachers know what is appropriate for the students, hence, the materials they will provide, in case none is available in the school library, are more effective to the students. Thus, the lower the library resources get, the higher the success in Science quiz competitions shall be.

The other variables like gender, age, size of the family, education and occupation of the parents, family income, study habits, attitude in Science, self-efficacy, locus of control, number of times joining, teaching experience, seminars attended, number of hours of review/training conducted, class size, laboratory facility, and laboratory equipment did not record a significant effect to the success in Science quiz competition this is supported by the computed p-values, which are higher than 0.05 and 0.10 level of significance. It means that success in Science quiz competition can be assed or can be evaluated even without considering these variables.

Furthermore, Table 12 shows that the analysis of variance resulted from the combined and single effects obtained an F-value of 1.738 and significant F of 0.04272 which is lower than the 0.05 level of significance. This means that there is a basis for not rejecting the hypothesis. Based on this analysis there exists a significant effect of various predictors of student, teacher/coach, school-related factors on the success in Science quiz competition.

Generally speaking, these teacher-related factors recorded a combined effect of 35.32% to the success in Science quiz competition, as reflected by R square of 0.3532

V. CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

1. There is no sufficient evidence to say that collectively, student, teacher, and school-related factors influencing the performance/grade in Science of winning students in Science quiz competitions have significant relationship.

2. Only the education of the father under student factors appeared to have a significant effect on coach preparation. Under teacher-related factors area of specialization is highly significant. On the other hand, library resource was the only variable under school-related factors which has significant effect on coach preparation. These 3 variables combined accounted for the total great significance of independent variables on coach preparation (competence, emotional intelligence, morale, and personality).

3. Only 2 out of 22 independent variables recorded significant effect on the success in Science quiz competition; and these are area of specialization (teacher/coach factor) and library resource (school factor). The first variable registered highly significant while the later being significant.

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