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Effect on Real-world Thinking Skills of Students Exposed to Practical Intelligence Approach Among Science Majors

Celeste T. Mercado
Pangasinan State University, Lingayen Campus

Abstract - *The focus of the study is to determine the real world thinking skills of students after being exposed Practical Intelligence (PI) Teaching Approach as an intervention in Genetics class.*

The study used the Real-World Test, a type of test administered to measure the practical problem-solving skills of the students. The test is composed of common scenarios that high school students experience or encounter in a typical science class such as experimentations, working and communicating with the teachers and group leaders, maintaining discipline and cooperation among the group members and dealing with difficult situations.

Two sections of second year Genetics students in a university located in Northern Philippines were taught by the researcher using the PI Teaching Approach and the conventional approach, respectively for eight weeks during the second semester of School Year 2015-2016.

It was observed that the PI Approach group had a better grasp of how it is to connect or communicate with people at least within their group. Due to this, the students became more efficient in doing practical tasks as seen in their performance in laboratory activities and their enthusiasm in doing things practically. Also, it was observed that the PI Approach group considered the practical value of things as reflected in their attitudes (recycling of bottles and scrap materials in the lab) and in the recitation where they sounded the pragmatic considerations in making decisions.

Keywords: Real-World Skills, Practical intelligence

INTRODUCTION

How does a person succeed in life? Is there a perfect formula offered by schools to ensure success? Is academic intelligence sufficient to enable an individual to succeed?

People need all of their skills in good working order to be successful in life. Yet many educational programs focus only in developing people's intelligence in only one aspect, analytical intelligence, while giving minimal or even no attention to two other areas of intelligence, creative and practical intelligence, that are just as vital to living successfully (Sternberg, 1998). Individuals who are labeled unintelligent by means of conventional examinations may in fact have the talents to succeed in life while those labeled as intelligent may be less endowed with such talents (Sternberg, 1997). This was found in the results of studies done in diverse settings to assess intelligence as an adaptation to the environment.

The researches done by Carraher, Carraher & Schliemann (1985), Ceci and Roazzi (1994) focused on Brazilian street children who were under great contextual pressure to form a successful street business. The researchers found out that the children who were able to do mathematics needed to run their street business were often minimally able or unable to do school mathematics. The more abstract and removed from real-world contexts the problems were in presentation, the worst the children did on the problems. The results suggest that differences in context can have a powerful effect on performance.

Practical intelligence is what most people call common sense (Albrecht, 2007). It is the ability to adapt to, shape, and select everyday environments**.** It is used when information processing is applied to contextualize everyday problems. It involves people who execute a skill.

It is the mental ability to cope with the challenges and opportunities of life. What counts as practical intelligence, common sense, or wisdom depends on the *context* in which one hopes to find it. It is situational. A person might be wise in the ways of business, but not at all wise in his or her dealings with fellow human beings. Someone might be considered wise in the practice of some scientific specialty, but not wise in managing his or her personal finances (Albrecht, 2007).

Sternberg & Grigorenko's (2000) tests of practical intellectual abilities correlate weakly or not at all with conventional tests of intelligence and predict real-world occupational success as well as or better than conventional tests of academic intelligence. Under special circumstances, tests of practical intelligence may show negative correlations with conventional ability tests.

Statement of the Problem

The study seeks to develop and assess real world skills among science majors on the course genetics.

Specifically, the study seeks to answer the following question:

1. What are the real world skills of students exposed to practical intelligence teaching approach and how do they differ with those not exposed?

METHODOLOGY

In this section, the research design, the instruments to be used, the description of the research participants and the data collection and analysis procedures are presented.

Research Design:

This is a quasi - experimental study that utilizes the non-equivalent control group. The study is quasi-experimental because it was not possible for the researcher to assign the samples randomly to any group since the groups were already formed and intact even before the treatment (X). The only randomization possible was to assign the intact groups to be anyone of the following groups: PI approach and conventional teaching approach by means of a coin toss. The study utilized a non-equivalent group design because only one group is given the treatment (X) while the other is not (~X).

The Sample

The research participants consist of eighty-four (110) second year college students students from two intact classes in Pangasinan State University, a state run university located in the northern part of the Philippines. The two classes were randomly assigned treatment by means of a coin toss. The two classes are considered pilot sections and most of the students are of high ability. The researcher is the regular science teacher assigned to these two sections for the School Year 2015-2016, second semester under the course Genetics.

The researcher gathered data on the students' rank order in the family, performance of household chores, responsibility in class or club and engagement in sports through the Students Personal Questionnaire (SPQ).This is because the researcher thought this information might affect or influence students' practical intelligence. Students' profile in the different categories was thought to give salient explanations on the result of this study.

Information on the different characteristics of the students such as rank order in the family, performance of household chores, responsibility in the class or club and engagement in sports are presented in the succeeding table.

Table 1
Student responses in selected items from the Student's Personal Questionnaire

SPQ Item	Category	Conventional Approach Group		PI Approach Group		Total	
		N	%	N	%	N	%
Rank Order in the Family	1st	24	50.00%	24	50.00%	48	50.53
	Middle	10	20.83%	14	29.16%	24	25.26
	Last	12	25.00%	6	12.50%	18	18.95
	Only	2	4.16%	2	4.16%	4	4.21
Performance of Household Chores	Yes	43	89.58%	35	77.77%	78	82.11
	No	5	10.42%	11	22.91%	16	16.84
Responsibility in Class/Club	Officer	10	20.83%	12	25.00%	22	23.16
	Non-Officer	38	79.16%	34	70.83%	72	75.79
Engagement in Sports	Yes	31	64.58%	29	60.41%	60	63.16
	No	17	35.41	17	35.41%	34	35.79

It could be seen from Table 4 that 48 or half of the students (50.53%) rank 1st among the siblings in the family, 24 (25.26%) are middle child, 18 (18.95%) are youngest child and 4 (4.21%) are only child. Most of the students (82.21%) do household chores while 16 (16.84%) do not do household chores. Twenty-two (23.16%) of the students are class or club officers while most of them (72 or 75.79%) are not officers. Majority (60 or 63.16%) of the students are engaged in sports while 34 (35.79%) are not engaged in sports. These data mean that the research participants are not really exposed to doing or exercising practical tasks than when they are actively engaged in sports or take an office in the class or club.

Majority of the students fall under the 1st and middle child category. According to them, their parents did not expect them to be contributing a lot when it comes to doing household chores since they have maids in the house. Their parents pampered them and made them feel they are a blessing from God but despite this, most of them still do household chores but not on a daily basis. In taking responsibility in the club, only a few hold a position or office. According to them, they wanted to focus more in the academics since holding a position in any organization is demanding of time and effort hence, less social and interpersonal skills were developed in them. With regards to engagement to sports, most of them are playing games but not on a regular basis. Most of the time, they play with their family members or close friends.

Information gathered from the SPQ questionnaire was necessary as they led explanations to various aspects of the study. These are practical skills necessary for daily life and the skills' development level could seriously promote or hamper our successful adaptat`ion in the surrounding material or social environment (Malgozata, Berzina, 2000).

Students from both groups had almost the same profile in terms of SPQ items such as rank order in the family, performance of household chores, responsibility in class or club and engagement to sports. It came out that the research participants are not really practically oriented.

Instrument

The Real-World Test is a teacher made test administered to measure the practical problem-solving skills of the students. The test is composed of common scenarios that high school students experience or encounter in a typical science class such as experimentations, working and communicating with the teachers and group

leaders, maintaining discipline and cooperation among the group members and dealing with difficult situations.

In Tables 2 and 3, the independent and related samples t-test for the PI Approach group and conventional group in the RWT are presented.

Table 2
Independent samples t-test for RWT pretest, posttest and gain scores

Measure	Group	Mean	SD	df	t ratio	Sig.
Pretest	PI Approach	3.58	1.357	89	-1.399	.165
	Conventional	3.93	1.063			
Posttest	PI Approach	3.96	1.127	89	-.847	.399
	Conventional	4.17	1.322			
Gain	PI Approach	.38	1.614	89	.454	.651
	Conventional	.24	1.286			

From Table 2, it can be seen that there are no significant differences found in the pretest and posttest scores between groups. Both groups performed similarly in the RWT pretest and posttest with the PI Approach group having a numerically higher gain. It was observed that the PI Approach group had a better grasp of how it is to connect or communicate with people at least within their group. Due to this, the students became more efficient in doing practical tasks as seen in their performance in laboratory activities and their enthusiasm in doing things practically. Also, it was observed that the PI Approach group considered the practical value of things as reflected in their attitudes (recycling of bottles and scrap materials in the lab) and in the recitation where they sounded the pragmatic considerations in making decisions.

Table 3
Related samples t-tests for pretest and posttest scores in the RWT

Group	RWT Pretest Mean	RWT Posttest Mean	df	*t* ratio	Sig
PI Approach	3.58	3.96	44	1.570	.123
Conventional	3.93	4.17	45	1.262	.214

No significant difference was found in the scores of the two groups though the conventional group had a slightly higher mean posttest score (Table 3). The PI Approach group had a greater gain in their posttest scores though the result was not statistically significant. Thirteen (13) students in the experimental group had a score of 5 and above in the RWT while 19 had a score of 5 and above in the control group. About 49% (22 students) had positive gains for the PI Approach while 34.8% (16 students) had positive gains for the conventional group.

Item analysis of the RWT was also done. The PI Approach had a significant increase in their score from the pretest to the posttest on item 3 (t = 2.458, d.f. = 44) while no significant increase was noted for the conventional group. In Table 4, the mean score of the two groups per each item as well as their gains are compared.

Table 4
Item Analysis of Posttest and Gain Scores in the RWT

Measure	Item Number	Group	Mean	t-ratio	df	sig
Posttest	1	PI Approach	4.44	-.542	89	.589
		Conventional	4.61			
	2	PI Approach	3.71	-2.244	89	**.027**
		Conventional	4.22			
	3	PI Approach	4.20	1.264	89	.210
		Conventional	3.87			
	4	PI Approach	4.38	-.137	89	.891
		Conventional	4.41			
	5	PI Approach	4.00	.730	89	.467
		Conventional	3.72			
	6	PI Approach	3.93	.767	89	.445
		Conventional	3.70			
	7	PI Approach	3.76	-.379	89	.706
		Conventional	3.85			
	8	PI Approach	3.82	1.263	89	.210
		Conventional	3.48			
Gain	1	PI Approach	.40	.653	89	.516
		Conventional	.11			
	2	PI Approach	.16	.012	89	.990
		Conventional	.15			
	3	PI Approach	.53	1.419	89	.159
		Conventional	.04			
	4	PI Approach	.02	.482	89	.631
		Conventional	-.11			
	5	PI Approach	.02	.968	89	.336
		Conventional	-.37			
	6	PI Approach	.09	.435	89	.665
		Conventional	-.09			
	7	PI Approach	-.22	-.877	89	.383
		Conventional	.02			
	8	PI Approach	.20	2.057	89	**.043**
		Conventional	-.35			

From Table 4, it can be seen that the PI Approach group and the conventional group only significantly differ in item 2 with the conventional group having a higher score while in terms of gain, the PI approach had a significantly higher gain in item 8.

Conclusion and Recommendation

Most of the students from the PI Approach were enthusiastic about the lessons and the activities. Since students enjoy hands-on activities, they tend to get excited with these activities and finish their output ahead of time. Because of this, some students did extra or

volunteer work or tasks like solving more genetics problems, fixing the chairs, picking up trashes, erasing the writings on the board and cleaning the laboratory tables and even recycling trashes in the lab (pragmatic valuing). It was surprising that the experimental group has the lesser number of students who are of class/club officer and in terms of number of students who perform household chores compared to the control group.

At some cases, students would ask relevant questions about how the lesson applies to their families and communities or to other persons they know. They seemed to enjoy exploring further the topics or concepts learned and how useful these are to their lives. On the other hand, the conventional group showed less enthusiasm as it is in the PI Approach group though there was no incident wherein the class lost interest in the subject. They still were very attentive and curious.

It is recommended that assessment may be designed to cater to real world skills of the students for them to connect learning with actual or real events in their lives.

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