

College Students Motivational Orientation in Chemistry

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Abstract - *This study assessed the motivational orientation in Chemistry of College students of Nueva Ecija University of Science and Technology. The survey used in the study was the motivational checklist which was composed of three parts namely self-efficacy, intrinsic value, and test anxiety. The descriptive method of research was employed utilizing the Motivational Orientation checklists to gather data and reinforced with observations. The statistical treatment of data was confined to the Weighted Mean, Mean Difference Analysis and the Pearson Product Moment of Correlation. Results show that respondents were very high in self-efficacy, as manifested in their expectations to do well in Chemistry. There is a significant relationship between self-efficacy and intrinsic value however there are no significant differences in the motivational orientation of male and female students along with the three components. It is recommended that Chemistry teachers should devise ways and means to come up with varied styles of examinations and tests that will minimize the occurrence of test anxiety among students.*

Key Words: Motivation, self-efficacy, intrinsic value, test anxiety

Introduction

Success in the instruction of Chemistry is expedient on teachers to have insights on some factors that hinder or enhance students' success in the subject. Effective delivery of instruction requires teachers of Chemistry some responsibilities like determining the principal activities in which they will engage directly while teaching. Such choices usually involve several of the following giving formal or informal lectures, conducting group discussions, organizing various types of role

playing, giving demonstrations, supervising fieldwork and instruction, conducting field works and community work, and selecting appropriate instructional materials. One aspect of the rationale for teaching and learning relates to the way the teacher regards his subject matter content and that of the learners. Teachers must exert efforts to inculcate into the minds of the students the need to improve their ability to work effectively with others and to learn to think ability to work effectively with others, and to learn to think critically and scientifically. The teacher wanting to do his best will have discovered that there is a larger aim- that of awakening the interest of the learners, of bringing them to react and to delight in the use of mind, the enjoy the process of gaining information in order to follow ideas to see where they lead. The true teacher will accept this responsibility- to increase his capacity to lead the learners through his subject matter content, not merely to know and to feel comfortable in doing so.

This study is based on the premise that performance in nay endeavor like learning Chemistry is related to the students' appraisals of the usefulness of the course, their interests and motivations in Chemistry.

"Motivation is the driving force behind the energy required to complete a task, a lack of motivation will give rise to a lack of driving power behind completing a certain task." (N., Pam M.S, 2013). It is the force or energy that results in engagement (Gregory & Kaufeldt, 2015). Motivation is an important aspect in instruction because unless students are interested in the subject they do not pay attention and they do not learn. If teachers want their students to study their lessons well, there is a need to arouse students' interest. The main base of motivation is the need of the learner.

There are general functions teachers should remember in their teaching. According to More (1995) that teachers must enable the students to acquire the cognitive knowledge, the affective or appreciation of what is right,

noble and beautiful, and the psychomotor skills they need to make their lives worthy. He adds that an effective teachers should equip the students with knowledge , attitudes, and skills that will make them good, useful and productive citizens.

On the same direction, Brannigan (1996) puts forward that every teacher has a guidance function. He comments that guidance function is an innate part of function of a teacher. The teacher needs to guide and counsel students whenever they meet problems especially in connection with their studies. The teacher must train students how to make independent and wise decisions for themselves as teachers assume the position of loco parentis for students in school .He remarks , too, that a teacher should be able to exert a great influence upon the students so that they will be motivated to work harder and develop ambitions or goals for their lives.

Shiefele (1991) proposed some features of interest in an endeavor. He proposed the following :

1. Interest is a content-specific concept.It is always related to specific topics, tasks or activities.
2. When understood as a content-specific concept, interests fit well with the modern cognitive theories of knowledge acquisition, in that information is always acquired in particular domains.
3. Subject matter-specific interest is probably more amenable to instructional influence than are general motives or motivational orientation.
4. A personal interest refers to what an interest brings to some environment or context.Typically some students enter the classroom already interested or disinterested in the subject. On the other hand, situational interest refers to an interest that people acquire by participating in an environment context. Thus, the personal interest approach emphasizes working with individual differences ,whereas the situational interest approach emphasizes the importance of creating an appropriate environmental setting, From an educational point of view, situational interest is the real concern of teachers. Winteler (1993) remarks that interest and achievement motivation are two important factors that enhance performance, achievement.Interest represent a theme focused on motivational variables while performance motivation can be regarded as a general motivational orientation that elicits students' interests and resources to perform better without necessarily specifying a particular area of concern.

On the other hand, Zigler (1985) considers motivational orientation variable is an essential construct that has been

associated with academic performance. It can inhibit or motivate students to strive harder.

Students' appraisal of the value of Chemistry energizes their zeal to ascertain the course.conscious of the significance of Chemistry to their lives enhances their cravings to learn more of it.

This study is conducted to assess the motivational orientation of students in Chemistry and its relationship to performance. Specifically , it seeks to find answers to the following objectives :

1.to describe the respondent's motivational orientation in terms of:

- a.self-efficacy
- b.intrinsic value
- c.test anxiety

2.to determine if there is a significant relationship of the three components of motivational orientation

3.To determine if there is a significant relationship between sex and motivational orientation.

Hypotheses

The following hypotheses were tested:

1. The three components of motivational orientation are not interrelated .
2. Male and female students do not differ in their motivational along the three components.

Methods

In determining the motivational orientation of the respondents , the descriptive method was employed utilizing checklists to gather data and reinforced with observations.A descriptive method seeks and describes something out there such as the status, condition or experience of a subject (De Belen , 2015).The descriptive research was preferred by the researcher primarily because it is the best method that suits the purpose of the study.It was cited by De Belen (2015) , that a descriptive research is a method used to obtain information concerning the current status of the phenomena to describe" what exists", thus basically answering "who", "what". "why" and "how" about the subject of the study,whether pertaining to the variables or specific conditions.Moreover, this method has proved its validity and reliability including its simplicity in many studies.Finally, the descriptive method lends itself appropriately to investigations which provide normative standard based on what is prevalent, like the present undertaking.

To further elucidate findings that needed amplification and elucidation, the techniques of observation and interviews were likewise employed.

Purposive sampling was used in this study. A total of 220 college students from the College of Education and College of Engineering of the Nueva Ecija University of Science and Technology voluntarily participated in the study.

The instrument to gather the data was the modified motivational Orientation Checklist. The checklist consisted of three parts with ten (10 item each). Part I focused on self-efficacy. Part II dwelt on intrinsic value and part III centered on test-anxiety.

In view of the revisions made and for the checklist to be culture-free, the survey instrument was subjected to a test-retest to establish reliability and validity content employing Pearson's Moment of Correlation. A reliability index of .67 was observed which implied reliability of the checklist and likewise a manifestation of its content validity.

The Mean weighted average, Pearson product moment of Correlation and mean difference analysis were employed in the analysis of data.

Result and Discussion

1. Students' Motivational Orientation in Chemistry

1.1 Self-Efficacy

Table 1. Students' Motivational Orientation in Terms of Sel-Efficacy

Level	Scores	f	%
Very High	43-50	17	7.70
High	35-42	61	27.70
Average	26-34	112	50.90
Low	18-25	28	12.90
Very Low	10-17	2	0.90
Total		220	100

Seventeen (17) or 7.70 percent were identified to be very high in their motivational orientation in Chemistry in terms of self-efficacy; 61 or 27.70 percent were found to be high; 112 or 50.90 percent were recognized to be average; 28 or 12.70 percent were affirmed to be low; and two (2) or .90 percent were categorized to be very low.

The students' motivational orientation in Chemistry in terms of self-efficacy is varied through majority of the students can be described to be average along this measure. Generally, the students can be discerned as possessing the efficiency for acquisitions in the

subject. They can become productive when instructors exert efforts to motivate them as they have the capability to meet the requirements of the subject. The students perceive themselves to be able to enjoy and attain designated performance of skills for specific tasks associated with Chemistry.

Students with high self-efficacy are more likely to give more effort to complete a task and to persist longer than a student with low self-efficacy (Bandura, 1986).

Table 1.1.2 Students' Motivational Orientation in Chemistry Along The Measure of Self-efficacy

Items	WM	Description
1. I expect to do very well in my class in Chemistry	3.41	Generally true
2. I am sure that I can do an excellent work on the problems and tasks assigned to me in Chemistry	3.08	true
3. I know that I am learning a lot in Chemistry	3.32	true
4. I can solve problems in Chemistry.	3.01	true
5. I know a lot of formula in Chemistry	3.06	true
6. I think I am performing well in Chemistry	3.15	true
7. I have excellent study habits	3.01	true
8. My computation skills are good.	3.07	true
9. I am certain that understand concepts in Chemistry	3.17	true
10. I perform Chemistry experiments very well.	3.38	true

Table 1.1.2 presents the verbal descriptions of the item-statements on students' motivational orientation in Chemistry along the measure of self-efficacy.

The Students disclosed that generally true to them is their expectation to do very well in their class in Chemistry. They remarked that the following item-statements are true to them. They perform Chemistry experiments very well; they know they are learning a lot in Chemistry; they think they are performing well in Chemistry; they know a

lot of formula in Chemistry; their computational skills are good; they can solve problems in Chemistry very well; and , they have good study habits.

Students' expectations that they do very well in their class in Chemistry is a motivating factor. Favorable self-perceptions of the students reflective of their motivational orientation in terms of self-efficacy are essentials towards satisfactory performance in Chemistry. The students' expectations aid in the students' performance of experiments, solutions of problems, knowledge of formula, and in the understanding of concepts.

1.2 Intrinsic values

Table 1.2.1 Students' Motivational Orientation in Chemistry in terms of Intrinsic Values

Level	Scores	f	%
Very High	43-50	51	23.20
High	35-42	95	43.20
Average	26-34	69	31.40
Low	18-25	5	2.30
Very Low	10-17	0	0.00
	Total	220	100

Fifty-one (51) or 23.20 percent were found to be very high in their motivational orientation interms of intrinsic values; 69 or 31.40 percent were categorized to be high; 95 or 43.20 percent were discerned to be average; and, five (5) or 2.30 percent were classified to be low.

The students' motivational orientation towards Chemistry along the measure of intrinsic values ranged from average to high to very high. Thus, the respondents can be described as students who are cognizant of the inherent importance, worth, and desirability of Chemistry. When students feel how important Chemistry is, there is the probability that they will exert efforts to come up to their expectations; hence, favorable performance in the subject is ensured. Students' perceptions of Chemistry as a worthy subject motivates them to perform at their best.

Table 1.2.2 Students' Motivational Orientation in Chemistry Along The Measure of Intrinsic value

Items	WM	Description
1. I think that what I am learning	2.87	true
2. It is imporant to me to learn what is being taught in our class in Chemistry.	2.90	true

3.I prefer class work in Chemistry that is interesting so that I can learn new things.	2.65	true
4I should learn Chemistry because it is important to my life.	2.79	true
5.I exert efforts in learning Chemistry because it is challenging.	2.33	Slightly true
6.It is important that I improve my skills in computation.	2.23	Slightly true
7.Our lessons in Chemsisty are enjoyable and interesting.	2.53	Slightly true
8. I like Chemistry tasks involving experiments.	2.58	Slightly true
9.What I am learning in Chemistry train me to become more analytical.	2.45	Slightly true
10.I think that Learning Chemistry is very valuable.	2.50	Slightly true

Table 1.2.2 presents the verbal descriptions of the item-statements on students' motivational orientation in Chemistry along the measure of intrinsic values.

The students expressed that the following item-statements are true to them;it is important for them to learn what is being taught in their class in Chemistry, they think that what they are learning in Chemistry is interesting; hey should learn Chemistry because it is important to them; and they prefer class work in Chemistry that is interesting so thay they can learn new things.

Slightly true to the students included the following : they like Chemistry tasks involving experiments , lessons in Chemistry are enjoyable and interesting;They think that Learning Chemistry is very valuable;It is important to improve their skills in computation.; and they exert efforts in learning Chemistry because it is challenging. There are intrinsic values students see in Chemistry as a subject to the Students, what is being taught in their class in Chemistry is very important and everything they learn in Chemistry seems very interesting.Thus, the students expressed that they should learn Chemistry because they are aware how important it is to them, The intrinsic values students have for Chemistry can promote interest, eagerness, and enthusiasm among the students to study

Chemistry. Success in Chemistry follows with intrinsic values students associate with the subject.

Table 1.3.1 Students' Motivational Orientation in Chemistry in terms of Test Anxiety

Table	Level	Scores	f	%
1.3.1	Very High	43-50	36	16.40
	High	35-42	79	35.90
	Average	26-34	80	36.40
	Low	18-25	18	8.20
	Very Low	10-17	7	3.20
	Total		220	100

presents the degree or level of the students' motivational orientation in terms of test anxiety.

Seven (7) or 3.20 percent were found to be very low in test anxiety; 18 or 8.20 % were low; 80 or 36.40 percent were average; 79 or 35.90 percent were high and, 36 or 16.40 percent scored very high in test anxiety.

The students do experience test anxiety. Seemingly, the majority of the students have apprehensions or fears relative to examinations in Chemistry.

Table 1.3.2 Students' Motivational Orientation in Chemistry in terms of Test Anxiety

Items	WM	Description
1. I feel upset every time I take a test in Chemistry.	5.05	Definitely true
2.Thoughts of getting a low grade in Chemistry interferes with my concentration during a test.	3.78	Generally true
3.I suffer mental block when taking a test.	3.57	Generally true
4. I feel nervous during a test because I don not want to have a disappointing performance.	3.81	Generally true
5.I always feel I am not ready when I take a test.	3.68	Generally true
6.I feel afraid every time I take a test in Chemistry.	4.02	Generally true
7.During a test in Chemistry, I feel very tense.	3.60	Generally true

8.When taking a test in Chemistry, I have an uneasy feeling .	3.43	Generally true
9. .When I take a test in Chemistry , I think how poorly I am doing.	3.53	Generally true
10. I am so nervous during a test in Chemistry that I cannot remember facts that I have learned.	3.83	Generally true

Table 1.3.2 presents the verbal descriptions of the item-statements on students' motivational orientation in Chemistry along the measure of test anxiety.

Definitely true to the students in terms of test anxiety is becoming upset everytime they take a test in Chemistry. Generally true to the students relative to test anxiety included the following : Feeling afraid and nervous during a test because they do not want to have a disappointing performance,; the thoughts of getting a low grade in Chemistry interferes with their concentration during a test; getting nervous during a test for fear that they cannot remember facts they studied earlier; and , feeling tense, uneasy , and uncomfortable during tests.

Test anxiety predominates among the majority of students .They feel psychologically disturbed during examinations for fear that they may not perform the way they expect themselves to achieve.At times, the students remarked that they tend to forget what they studied for an examination as a consequence of the fear and apprehensions they have during examinations.

2. Interrelationship of the Three Components of Students' Motivational Orientation

Table 2 . Correlation Coefficients Matrix

Motivational Orientation	Self-Efficacy	Intrinsic value	Test Anxiety
Self-efficacy	1.000	.636*	.029
Intrinsic Value	.635*	1.000	-.002
Test Anxiety	.029	-.004	1.000
Mean	32.4273	37.000	25.5364
Standard Deviation	6.4098	6.3462	8.1719

2.1 Self-efficacy and intrinsic values

The coefficient of correlation to establish a significant relationship between students' self-efficacy and intrinsic values was .636 which was significant at .05 level. A significant relationship between self-efficacy and intrinsic value was drawn. Findings imply that the higher the students self-efficacy, the more favorable they will be in their valuations of the intrinsic value of Chemistry. The acquirement efficiency and capability of students and their perceptions of their capabilities for Chemistry work help advance the students' valuations of Chemistry as subject in terms of its worth and importance.

The hypothesis that there is no significant relationship between students' self-efficacy and intrinsic motivation was, thus, rejected.

2.2 Self-efficacy and test anxiety

To establish significant relationship between students' self-efficacy and test anxiety, the computed r-coefficient was .029 which was not significant at .05 level. No significant relationship between self-efficacy and test anxiety was observed. Information base suggests that no matter how a student perceives himself or herself as competent in Chemistry, the student will develop apprehension during examinations in Chemistry.

The hypothesis that there is no significant relationship between students' self-efficacy and test anxiety was, thus, accepted.

2.3 Intrinsic values and test-anxiety

The correlation coefficient to test the hypothesis "students' intrinsic values is not significantly related to test anxiety" was -.004 which was not significant at .05 level. No significant relationship between intrinsic value and test-anxiety was observed. Findings infer that no matter how a student places importance, worth, desirability of Chemistry as a subject, the student still develops

Sex	mean	SD	T-value	df	2-tail significance
Male	36.61	6.48	-.569	38	.572
female	37.56	5.87			

apprehension and becomes alarmed, and feels uncomfortable during examinations in Chemistry.

The hypothesis that there is no significant relationship between intrinsic value and test-anxiety was, thus, accepted.

3. Difference in the Motivational Orientation Along the Three Components of Male and Female Students

3.1 Self-efficacy

Table 3.1 Computed T-Value for the mean difference between Male and Female Students' Motivational orientation along Self-efficacy

Sex	mean	SD	T-value	df	2-tail significance
Male	32.92	6.97	.234	38	.816
female	32.53	6.08			

Table 3.1 presents the comparative t-test values to establish significant difference in the motivational orientation of male and female students along self-efficacy.

The computed t-value to test whether male and female students differ in their motivational orientation along self-efficacy was .234 which was less than the two-sided tabular t-value at $p = .05$. No significant differences were observed between the two sex groups in their motivational orientation along the components of self-efficacy. Findings imply that both male and female students are similar in their acquirement efficiency, productiveness, and capability. They are alike at their perceptions of their capabilities to enjoy and attain designated performance of skills for tasks associated with Chemistry.

Social beliefs related to gender or sex contribute to one's mindset about performance level. Gender bias messages may influence whether students feel capable or possibly doomed to failure (Aronson & Steele, 2005).

The hypothesis that there is no significant difference in the motivational orientation of male and female students along self-efficacy was, thus, accepted.

3.2 Intrinsic values

Table 3.2 Computed t-Value for the Mean Difference Between male and Female Students' Motivational Orientation along intrinsic values

Table 3.2 presents the comparative t-test values to establish significant difference in the motivational orientation of male and female students along intrinsic values.

The t-value to test whether male and female students differ in their motivational orientation along intrinsic values was -.569 which was less than the two-sided tabular t-value at $p = .05$. No significant differences were

observed between the two sex groups in their motivational orientation along the component of intrinsic value. Findings imply that both male and female students are similar in their valuations of Chemistry as regards its worth, importance, and desirability.

The hypothesis that male and female students do not differ in their motivational orientation along intrinsic values was, thus, accepted.

3.3 Test anxiety

Table 3.3 Computed t-value for the Mean Difference Between Male and Female Students' Motivational Orientation along Test Anxiety

Table 3.3 presents the comparative t-test values to establish significant difference in the motivational orientation of male and female students along test anxiety.

The obtained value to test whether male and female students differ in their motivational orientation along test anxiety was 1.239 which was less than the two-sided tabular t-value at $p=0.05$. No significant differences were observed between the two sex groups in their motivational orientation along the component of test anxiety. Findings imply that both male and female students equally manifest test-anxiety in Chemistry. Male and female students are alike in their apprehensions, uneasiness, and fear for examinations and tests in Chemistry.

The hypothesis that there is no significant difference in the motivational orientation of male and female students along test anxiety was, thus, accepted.

The findings of the study is similar to the study on the motivational components profiles of medical students. Findings revealed that there were no differences between male and female medical students for any of the components except career motivations. Among dentistry students there were no gender differences for intrinsic motivation, career motivation, self-determination and grade motivation. However, Results also showed that men and women differed with regard to self-efficacy. It also revealed that among pharmacy students there were gender differences for intrinsic motivation, self-determination and grade motivation but not for self-efficacy or career motivation. (Campos-Sanchez et al, 2014). Although gender differences in motivation to learn sciences are still poorly understood, they may result from several factors such as role modeling and socialization by parents, teachers, peers, and the media, rather than "innate or natural differences" between men and women. (Xie & Shauman, 2003; Bryan et al., 2011; Glynn et al., 2011).

Conclusion

The students were very high in self-efficacy as manifested in their expectations to do well in Chemistry; average to high in intrinsic values as reflected from their responses that it is important for them to learn what is being taught in their class in Chemistry; they think that they are learning in Chemistry is interesting; they should learn Chemistry because it is important to them, and, they prefer class work in Chemistry that is interesting so that they can learn new things, and, high to high in test anxiety as projected in their becoming upset everytime they take a test in Chemistry. There is no significant

Sex	mean	SD	T-value	df	2-tail significance
Male	27.56	8.76	1.239	38	.223
female	25.12	9.52			

relationship between self-efficacy and intrinsic values. However, no significant relationships were observed to exist between self-efficacy and test-anxiety and between intrinsic value and test anxiety. There are no significant differences in the motivational orientation of male and female students along the three components, namely, self-efficacy, intrinsic value and test anxiety.

References

Books:

1. Bandura, A. (1986). Social Foundations of Thought and actions: A Social Cognitive Theory. Englewood Cliffs, NJ: Prentice Hall
2. Brannigan, Gary C., (1996) The Enlightened Educator. New York: McGraw-Hill Co., Inc.
3. De Belen, R. T., (2015). Research Methods and thesis Writing. Wiseman Books Trading, Inc. Quezon City, Philippines
4. Gregory, Gayle and Kaufeldt, Martha (2015). The Motivated Brain: Improving Students Attention, Engagement and Perseverance. ASCD, Alexandria, Virginia USA
5. More, Kenneth D., (1995) Classroom Teaching Skills. New York: McGraw Hill Book Co., Inc.
6. Zigler, E., (1985) "Self-Image: A Cognitive Development Approach". The development of Self. New York: Academic Press

Online Publication:

7. Campos-Sánchez, A., López-Núñez, J. A., Carriel, V., Martín-Piedra, M. Á., Sola, T., & Alaminos, M. (2014). Motivational component profiles in university

students learning histology: a comparative study between genders and different health science curricula. BMC medical education, 14,46.<https://doi.org/10.1186/1472-6920-14-46>

Whole issue of journal :

8. Shiefele, U., (1991) Interest, learning and Motivation ‘. Educational Psychologist, Vol.26.
9. Winteler, A.(1993) Interest and Quality of Experience in the Classroom”. European Journal of Educational Psychology, Vol . 18.
- 10..Xie Y, Shauman KA. Women in science: Career processes and outcomes. Cambridge, MA: Harvard University Press; 2003. [Google Scholar]

Link / URL:

- 11.N., Pam M.S., "MOTIVATION," in PsychologyDictionary.org, April 7, 2013, <https://psychologydictionary.org/motivation/> (accessed March 1, 2021).
- 12.Bryan RR, Glynn SM, Kittleson JM. Motivation, achievement, and advanced placement intent of high school students learning science. Sci Educ. 2011;95:1049–1063. doi: 10.1002/sce.20462. [CrossRef] [Google Scholar]
13. Glynn SM, Brickman P, Armstrong N, Taasobshirazi G. Science motivation questionnaire II: validation with science majors and nonscience majors. J Res Sci Teach. 2011;48:1159–1176. doi: 10.1002/tea.20442. [CrossRef] [Google Scholar]