



Attitude of Degree Level Female Students towards Science Education in the Context of Women Empowerment

• Rupam Kumari • Sugandha • Mamta Kumari
• Rashmi Sinha

Received : November 2015

Accepted : March 2016

Corresponding Author : Rashmi Sinha

Abstract : *Education is the fundamental right and a pre-requisite to the development of a society. It removes unfounded beliefs, illogical prejudices and unreasoned loyalties from one's mind and enables us to come to a proper conclusion. Education empowers women and leads to their overall development. It enhances their capability and potentiality. Among the different disciplines, the science stream opens a broad path for women through education and employment. Science Education is pivotal for up scaling one's level of thinking. It not only enhances knowledge but it also builds a mindset with an ability to distinguish between good or*

bad and right or wrong. It promotes a scientific and systematic approach which leads to objectivity in decisions making. Financial autonomy boosts their confidence. The present study focuses on finding out the attitude of female degree level students towards women empowerment. The data collection was done on 180 degree level female students of science, arts and commerce streams of Patna Women's College under Patna University and College of Commerce under Magadh University. The Incidental sampling technique was used to select a representative sample. A questionnaire was framed for getting the desired result. The findings of the study indicated that the attitude of degree level female students towards Science Education in the context of women empowerment is positive. The female students also have a positive attitude towards the fact that Science Education influences the mind, social behaviour, way of working and independent behaviour of individuals. Based on the findings, the study concludes that Science Education enables women to develop a positive approach in solving the problems of the society.

Key Words: *Attitude, Science Education, Women Empowerment, Degree level female students.*

Rupam Kumari

Education, Session: 2015-2017,
Patna Women's College, Patna University, Patna,
Bihar, India

Sugandha

Education, Session: 2015-2017,
Patna Women's College, Patna University, Patna,
Bihar, India

Mamta Kumari

Education, Session: 2015-2017,
Patna Women's College, Patna University, Patna,
Bihar, India

Rashmi Sinha

Assistant Professor, Department of Education,
Patna Women's College, Bailey Road,
Patna – 800 001, Bihar, India
E-mail : rashmi.pwcbcd@gmail.com

Introduction:

Education is the most powerful weapon which we can use to change the world. It plays a pivotal role in shaping our life and transforming a person to lead a better life. Education makes a person, a right thinker and a correct decision maker.

Anugwom (2009) was of the opinion that education is the main tool for imparting skills and attitudes relevant to the contribution of the individual to the development of the society. From his study he concluded that an educated and skilled individual can contribute more towards the development of the society and its prosperity. Even **Imogie (2002)** stated that the prosperity of a country depends not only on the abundance of its revenue, or on the strength of its fortifications, but on the number of its citizens that are enlightened through education. Education not only enlightens people but also empowers women.

Education has a positive effect on the personality of women. It enhances the capability as well as the potentiality of women. **Fadeyi and Olonegan (2001)** viewed education as a process of enabling women to develop the capacity to actualize their potentials. Through education, women can gain all the powers necessary for her growth. Power means having the capacity and means to direct one's life and power, the key word of the term empowerment. It is a veritable tool for empowering women.

Empowerment can be defined as a process of strengthening the existing capacities and capabilities of women in the society to enable them to perform towards improving themselves, their families and society as a whole. **Enemu (1999)** asserts that the education of women is a multidimensional process, involving the empowerment and transformation of the economic, socio-psychological, political and legal circumstances of the powerless.

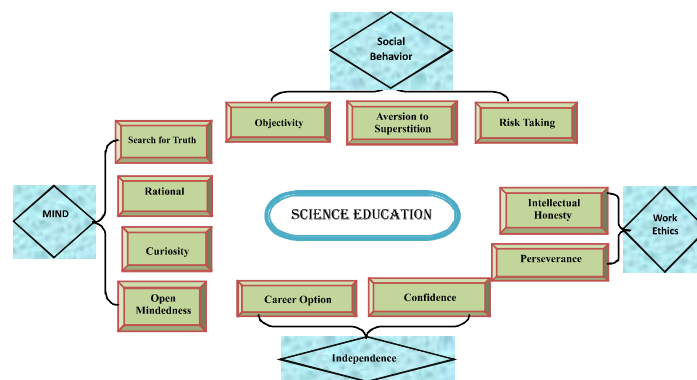
Empowerment enables women to develop confidence in their own capacities. This inner strength within them comes with the ability to get friendly with the new technologies. These new technologies are a boon of science, which help all of us and especially for women to grow in life. The study of science has opened up new avenues of growth and empowerment for women by making small but significant changes in their day to day life.

Science Education is a process as well as a body of knowledge, which is obtained through study, or practice. It is mainly concerned with sharing ideas, principles, processes and science content with people. **DeBoer (2000)** was of the opinion that science education provides intellectual training for the inductive process of observing natural phenomena in the learners. Through the learning and practice of the scientific method and by carrying out independent inquiries or lab experiments, a way of thinking is developed that enables individuals to act independently.

Science plays a significant role in empowering women. They acquire necessary skills and competencies in science and technology which do not empower them economically but enable them to take informed decisions on critical aspects of their lives. So the study of Science Education helps in establishing a scientific and literate society with the help of its various dimensions.

Dimensions of Science Education:

There are various dimensions of Science Education that can contribute to the development of society through the eradication of superstitions, by developing objectivity, open-mindedness, critical thinking, etc. The dimensions that we have taken up in our study are as follows :



The following four dimensions **influence the mind** of an individual and affect the psychological behaviour of human beings.

1. **Rational thinking-** It is the thinking process that employs logical, objective, and systematic methods in reaching a conclusion or solving a problem.
2. **Open mindedness-** It relates to the way in which people approach the views of others.
3. **Search for truth-** When we are seeking the solution to any problem, we try to find out the truth behind the problem.
4. **Curiosity-** Curiosity means a desire to learn or know something. Unless we are curious, new experiments and principles will not come up.

The following three dimensions of Science Education are related to the **social behaviour** of an individual and they all influence the social dealings of human beings. They are:

1. **Aversion to superstition-**A strong dislike for an irrational belief, a belief that certain events or things will bring good or bad luck.
2. **Objectivity-** The ability to make decisions based on facts rather than on your own personal feelings or beliefs.
3. **Risk taking-**It is the act or fact of doing something that involves danger or risk in order to achieve a goal.

The two dimensions of Science Education – Intellectual honesty and perseverance are related to the **work ethics** of an individual and they influence our way of working. They are given below:

1. **Intellectual Honesty-**Intellectual honesty is an applied method of solving problems with an honest attitude.
2. **Perseverance-** Perseverance originally comes from the Latin 'perseverantia' and means to abide by something strictly.

The dimensions – career option and confidence — are linked with independence and they influence the **economic** status of life. They are as follows:

1. **Career Option-** The progress and actions taken by a person throughout life, especially those related to that person's occupations.
2. **Confidence-** Having a feeling or belief that you can do well or succeed at something without the feeling of hesitation is what confidence means.

All these dimensions together work as an empowerment tool for women. They help women to grow and establish themselves in the society at large. Ultimately, these tools lead to women empowerment. Science Education helps in women's skill development, but it raises some questions, such as, whether it has really proved to be an effective tool of empowering the women ?

It is to search for the answer that the present research has been undertaken under the formal title, "**Attitude of Degree Level Students towards Science Education in the Context of Women Empowerment.**"

Operational Definitions of the terms used in the Study:

Attitude: An **attitude** is an expression of favour or disfavour towards a person, place, thing, or event. It is generally defined as the way a person responds to his or her environment, either positively or negatively. An attitude is a set of evaluative statements or judgments concerning people or events. In the present study, attitude refers to the responses of the degree level female students to the questionnaire given to them, where they had to give their opinion by ticking one option out of five.

Degree level female students: The female students who are enrolled in the final year of their graduation degree (B.Sc, IMB, Bio-Tech, B.Com, and B.A.) courses of Patna University and Magadh University have been taken as the degree level female students.

Science Education: Science Education is the systematic knowledge of a particular thing based on verified facts and principles. The principles of science education are clear, definite, broad-based, valid, pure, real and reliable in all respects. It creates an objective approach in dealing with different situations of life.

Women Empowerment: Women Empowerment is a social process that helps women in gaining control over their own lives. It inculcates capacity in them, for use in their personal lives, their community as well as society. Empowerment is the process of increasing the economic, political, social and educational strength of women.

Objectives :

1. To find out the attitude of degree level female students towards Science Education in the context of women empowerment.
2. To study the streamwise difference in the attitude of degree level girl students towards Science Education in the context of women empowerment.
3. To find out the difference in the attitude of degree level female students towards Science Education in the context of women empowerment between vocational and general courses of science.
4. To find out the difference in the attitude of degree level girl students towards Science Education in the context of women empowerment on the basis of academic achievement.

Hypothesis:

The first objective was concerned with finding out the attitude of degree level female students towards Science Education in the context of Women Empowerment. The attitude of the female students was found out through a set of questionnaires. Thus, no hypothesis was framed. The hypotheses corresponding to the second, third, and fourth objectives are given below:

H₂: There is a significant streamwise difference in the attitude of degree level female students towards Science Education in the context of Women Empowerment.

A null hypothesis was framed for statistical testing.

H₀₂: There is no significant streamwise difference in the attitude of degree level female students towards Science Education in the context of Women Empowerment.

H₃: There is a significant difference in the attitude of degree level general science and vocational science students towards Science Education in the context of Women Empowerment.

A null hypothesis was framed for statistical testing.

H₀₃: There is a no significant streamwise difference in the attitude of degree level female students towards Science Education in the context of Women Empowerment.

H₄: There is significant difference of high and low academic achievement in the attitude of degree level female students towards Science Education in the context of Women Empowerment.

A null hypothesis was framed for statistical testing.

H₀₄: There is no significant difference of high and low academic achievement in the attitude of degree level female students towards Science Education in the context of Women Empowerment.

Research Method:

Setting of the Study: This study was carried out on the final year i.e. 3rd year students of B.A., B.Sc. and B.Com. of Patna Women's College (Patna University) and College of Commerce (Magadh University).

Design of the Study: Simple descriptive survey method was employed to study and compare the variables under the study. In the descriptive survey method, data are collected from relatively large number of cases at a particular time.

Population of the Study: The final year degree female students studying in general courses and vocational courses of B.A., B.Sc. and B.Com. of selected Colleges of Patna University and Magadh University during the academic session 2015-2016 constituted the population of the study.

Sample of the Study: 180 final year degree level female students' i.e. 3rd year students of B.A., B.Sc. and B.Com. of Patna Women's College (Patna University) and College of Commerce (Magadh University) constituted the sample of the study.

Break-up of the sample:

	Name of the Institutions	Sample size	Degree level students			
			Science Stream		Arts Stream	Commerce Stream
			General Course	Vocational Course		
1.	Patna Women's College (Patna University)	90	15	15	30	30
			Total 30			
2.	College of Commerce (Magadh University)	90	15	15	30	30
			Total 30			
	Total	180	60		60	60

Tool of the Study:

The results of a research depend upon the quality and appropriateness of the tools used; hence, selection or development of appropriate tools is an important step in the research.

Description:

For the collection of relevant data, a questionnaire constructed and standardized by the supervisors of the study was used. It consisted of two parts, viz., '**Part-A**' for extracting personal information about the students included in the sample and '**Part-B**' an attitude scale for determining their attitude towards Science Education in the context of women empowerment.

The questionnaire consisted of 28 items. The statements/ items of the attitude scale were based on four aspects of the Science Education, viz. mind, social behaviour, work ethics and independent behaviour.

Reliability:

Reliability of the attitude scale was found by split-half method. The reliability coefficient of the two half tests was found to be 0.47 and the reliability coefficient of the whole test was found to be 0.64, using Spearman-Brown Prophecy formula. The reliability co-efficient of 0.64 was significant at 0.01 level which shows that the reliability of the attitude scale was high and the tool was sufficiently reliable.

Scoring:

Scoring was required only in Part-B of the questionnaire, the attitude scale. The items of the attitude scale were scored with the help of a handmade scoring key. Each statement or item of the scale had to be responded to on a **5-point scale** as 'strongly agree', 'agree', 'can't say', 'disagree' and 'strongly disagree'. For each positive statement, 5 marks for 'strongly agree', 4 marks for 'agree', 3 marks for 'can't say', 2 marks for 'disagree' and 1 mark for 'strongly disagree' was given. The total score was then calculated by summing up the scores of the individual items.

The total scores obtained were converted to z scores and five categories were determined as given below:

Sl. No.	Description	Range of raw scores	Range of z scores
1.	Very Positive Attitude	103 and above	+1.8 and above
2.	Positive Attitude	88-103	+0.6-+1.8
3.	Indifferent Attitude	72-88	-0.6-+0.6
4.	Negative Attitude	58-72	-0.6--1.8
5.	Very Negative Attitude	58 and below	-1.8 and below

Analysis and Interpretation:

Analysis Related To The First Objective:

The first objective of the study was to find out the attitude of degree level female students towards Science Education in the context of women empowerment. For this purpose, a questionnaire was administered to the students. Section – B of the questionnaire contained 22 statements/items which were used for finding out the attitude of degree level female students towards Science Education in the context of women empowerment. The results obtained on analyzing the **z score** of the responses for finding out the attitude of degree level female students towards Science Education in the context of women empowerment has been shown in figure 1.

Fig. 1 shows 3.33% of the female students concerned are such as show a highly positive attitude towards the fact that science education helps to empower women. 27.78% of the female students show a positive attitude to this fact. Whereas 40.56% of them show a neutral attitude. They are unable to give any kind of opinion regarding this. 23.89% of them have a negative attitude and 4.44% of them show a highly negative attitude towards the fact.

Although a maximum number of female students showed a neutral attitude to the fact that Science Education leads to women empowerment, still it is clear from the graph that the percentage of students having a positive attitude is more than the students with a negative attitude. Thus, with reference to the first objective we can say that the degree level female students showed a positive attitude towards Science Education in the context of women empowerment.

Science education influences the mind, social behaviour, work ethics and independent behaviour of the students. Analysis was also done to find out the influence of science education on these different dimensions.

The pie chart in Fig. 2 shows that 43.333% of students concerned are neutral towards the fact that science education influences the mind. 26.667% of them agree with this fact. 23.889% of them disagree with the fact and 3.333% of them strongly disagree, whereas 2.778% of them strongly agree with the fact.

It is clear from the pie chart that maximum female students show a neutral attitude to the fact that Science Education influences the mind. As the percentage of female students having a positive attitude towards this fact is more than those with a negative attitude, it can be inferred that Science Education influences the mind and, in the women students, helps in making them mentally strong. The high percentage of students showing a neutral view to this fact may be due to the ignorance of the importance of Science Education.

The pie chart in Fig. 3 shows that 42.778% of students concerned are such as to be neutral towards the fact that science education influences the social behavior of the students. 30% of them agree, 22.778% of them disagree, and 3.889% of them strongly disagree, whereas 0.556% of them strongly agree with the fact.

Although the percentage of students having a neutral view is highest, yet the percentage of students having a positive attitude is more than the negative attitude, it can be inferred that degree level female students have a positive attitude to the fact that Science Education influences the social behaviour of an individual. Thus, it can be said that risk taking ability, objectivity and aversion to superstition influences the social behavior of the students and helps them to be socially empowered.

The pie chart in Fig. 4 shows that 49.444% of students concerned are neutral towards the fact that science education affects the way of working of a person. 26.111% of them agree, 22.2222% of them disagree and 2.222% of them strongly disagree whereas 0% of them strongly agree to the fact.

Although the percentage of female students with a neutral attitude is the highest, the percentage of students with a positive attitude is more than the students with a negative attitude. Intellectual honesty is an applied method of solving problems with an honest attitude. And perseverance helps in solving the problem in an organized and systematic way. These attributes of Science Education affects the way of working of a person. Thus, it can be said that intellectual honesty and perseverance influence the work ethics of an individual and enable the female to be socially empowered.

The pie chart in Fig. 5 shows that 35.556% of students concerned are neutral towards the fact that science education influences independent behaviour. 33.889% of them agree, 25.556% of them disagree and 4.444% of them strongly disagree whereas 0.556% of them strongly agree with the fact.

Although the students with a neutral view are maximum, the students with a positive attitude to this fact are more than those with a negative attitude. It can be inferred that female students have a positive attitude to the fact that career option and confidence influence independent behaviour. Thus, career option and confidence influences an independent behaviour of an individual and help to empower the females mentally, socially and above all economically.

Analysis Related To Second Objective:

The second objective of the study was to study streamwise the difference in the attitude of degree level female students towards science education in the context of women empowerment.

The corresponding research hypothesis was:-

H₂: There is a significant streamwise difference in the attitude of degree level female students towards science education in the context of women empowerment.

A null hypothesis was framed for statistical testing as mentioned below:

H_{02} : There is no significant streamwise difference in the attitude of degree level female students towards science education.

In order to statistically test the above null hypothesis ANOVA was performed. The result is as given in table 1.

Table 1. shows that F- value is highly significant. Hence the null hypothesis H_{02} stands rejected and it can be inferred that there is a real difference in the attitude of the degree level female students studying Science, Arts and Commerce. The attitude of the female students differs on the basis of their streams. Since F-test was significant; t-tests were performed to find out the difference in the attitude of degree level female students towards science education. The results of the t-test have been summarized in the following three tables:

Table 2 and 3 confirm that there is streamwise difference in the attitudes of degree level female students towards Science Education in the context of women empowerment. There was a high significant difference between the attitude of Science and Arts degree level female students towards Science Education in the context of women empowerment at 0.05 level. The difference between the attitude of Science and Commerce students towards Science Education in the context of women empowerment was found to be highly significant at 0.05 level.

Table: 4 shows that there is no significant difference in the attitude of Commerce and Arts degree level female students towards Science Education in the context of women empowerment.

Analysis Related To the Third Objective:

The third objective of the study was to find out the difference in the attitude of degree level female students towards science education between vocational and general courses of science.

The corresponding research hypothesis was:

H_3 : There is a significant difference in the attitude of degree level general science and vocational science students towards science education in the context of women empowerment.

A null hypothesis was framed for statistical testing which is given below:

H_{03} : There is no significant difference in the attitude of degree level general science and vocational science students towards science education in the context of women empowerment.

In order to statistically test the above null hypothesis t-test was performed. The result is as given in table 5.

Table 5 shows that there is significant difference between the attitudes of general science students and vocational science students towards science education at 0.05 levels. Thus, the null hypothesis stands rejected. The students of the vocational course of Sciences have a more positive attitude than the students of the general course of Science towards Science Education in the context of women empowerment.

Analysis Related To the Fourth Objective:

The fourth objective of the study was to find out the difference in the attitude of degree level female students towards science education in the context of women empowerment on the basis of academic achievement.

The corresponding research hypothesis was:

H_4 : There is a significant difference between the high academic achievement and low academic achievement on the attitude of degree level female students towards science education in the context of women empowerment.

A null hypothesis was framed for statistical testing, which is given below:

H_{04} : There is no significant difference between the high academic achievement and low academic achievement on the attitude of degree level female students towards science education in the context of women empowerment.

In order to statistically test the above null hypothesis t-test was performed. The result is as given in Table 6.

Table 6 shows that there is a significant difference between the students of high and low academic achievement on the attitude of degree level female students towards science education in the context of women empowerment. The null hypothesis stands rejected. It can be inferred that students with high academic achievement have a more positive attitude towards science education in the context of women empowerment.

Conclusions :

- On the basis of this study, it can be concluded that the attitude of degree level female students towards Science Education in the context of women empowerment is positive. The female students also have a positive attitude towards the fact that Science Education influences the mind, social behaviour, and way of working and independent behaviour of the individuals.
- It can also be concluded that there is high significant difference between the attitude of Science and Arts students and also between the attitude of Science and Commerce students towards Science Education in the context of women empowerment. But there is no significant difference between the attitude of Commerce and Arts students towards Science Education in the context of women empowerment.
- The study also leads to the conclusion that there is a significant difference between the attitude of general science female students and vocational science female students towards Science Education in context of women empowerment.
- On the basis of the study we can conclude that there is a significant difference between the attitudes of female students of high academic achievement and female students of low academic achievement towards Science Education in the context of women empowerment.

Limitations :

- Due to paucity of time and resources a sample of only 180 degree level female students was taken, which restricted the scope of valid generalization.
- Only one college each of Patna University and Magadh University were selected for the study.
- The biggest limitation was that some students consulted each other while making the choice.

So, the result might have got affected due to this.

Implications :

- The present study reveals that Science Education plays a vital role in empowering women. Keeping this in mind, the policy makers of the curriculum should try to place more emphasis on Science Education as it would help in bringing about a change in cognitive, affective and psychomotor domain of the female students.
- The study brings to light that there are a number of attributes of science which influence the behaviour of the students, thereby affecting their mind, social behaviour, independent behaviour and way of working. This ultimately empowers the students mentally, socially and economically. So, in the light of this study the need of Science Education for empowering females in the society can be highlighted.
- The present study reveals that Science Education brings about change in the way of working of the students. It teaches females to be systematic and organized in their approach in solving their problems. It also develops in the females the ability to handle a problem scientifically. Thus, the females would be able to sense a problem, collect evidence, organize and interpret the data, and finally draw conclusions impartially.
- The study reveals that Science Education makes women able to take decisions based on verified facts and principles and enables them to distinguish between right and wrong.
- It is revealed by the study that Science Education brings about attitudinal change among the students, by enabling them to be critical in observation and thought, open-minded, always in search of the answers to 'What's' and 'Whys' and 'How's' of the things he/she observes, be objective in his/her approach to problems and empower one to discard superstitions and faulty beliefs.

LIST OF TABLES

Table 1. ANOVA to statistically test the H₀₂

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6798.633	2	3399.317	26.045 [*]	0.000
Within Groups	23101.917	177	130.519		
Total	29900.550	179			

Table 2. t-test to observe difference between attitude of Science students and Arts students of degree level female students towards science education.

Specification	N	Mean	Standard Deviation	t-value	df	Significance
Science students	60	87.85	8.153	5.231 [*]	118	0.000
Arts students	60	77.63	12.745			

Table 3. t-test to observe difference between the attitude of Science students and Commerce students of degree level female students towards Science Education.

Specification	N	Mean	Standard Deviation	t-value	df	Significance
Science students	60	87.85	8.153	7.514 [*]	118	0.000
Commerce students	60	87.85	12.753			

Table 4. t-test to observe difference between the attitudes of Arts students and Commerce students towards science education leading to women empowerment.

Specification	N	Mean	Standard Deviation	t-value	df	Significance
Arts students	60	77.63	12.745	1.919 [*]	118	0.057
Commerce students	60	73.17	12.753			

Table 5. t-test to observe difference between the attitudes of general science students and vocational science students towards science

Specification	N	Mean	Standard Deviation	df	t-value	Significance
Attitude of general science students	30	85.23	7.938	58	2.605 [*]	0.012
Attitude of vocational science students	30	90.47	7.619			

Table 6. t-test to observe difference in attitude of degree level female students towards Science Education in the context of women empowerment with respect to high and low academic achievement:-

Specification	N	Mean	Standard Deviation	df	t-value	Significance
Low academic achievement	24	78.67	12.811	176	2.350 [*]	0.020
High academic achievement	156	85.25	12.44			

LIST OF FIGURES

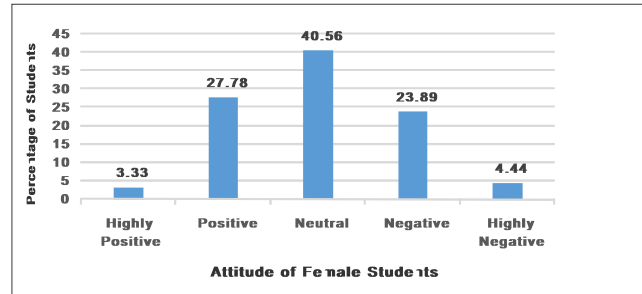


Fig. 1. Showing attitude of female students towards science education in the context of women empowerment in percentage

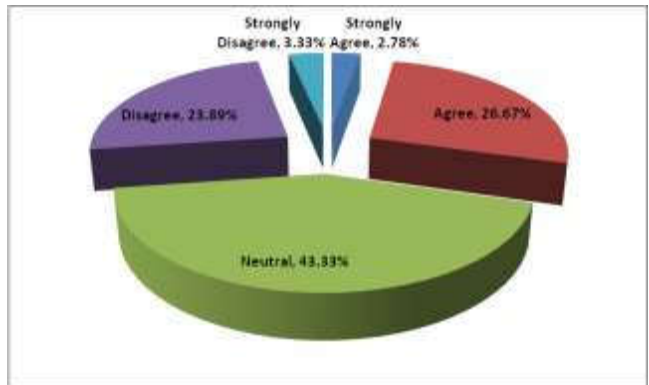


Fig. 2. Shows percentage of female students who agree that science education influences the mind.

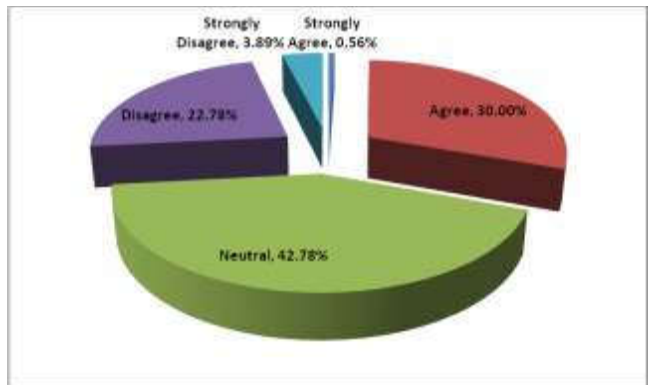


Fig. 3. Percentage of degree level female students who agree that science education influences social behaviour.

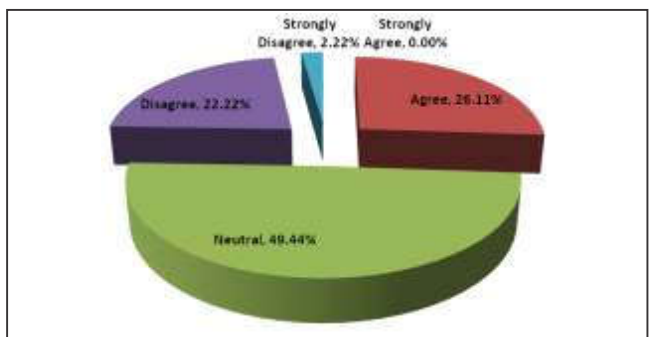


Fig. 4. The percentage of degree level female students who agree that science education influences work ethics.

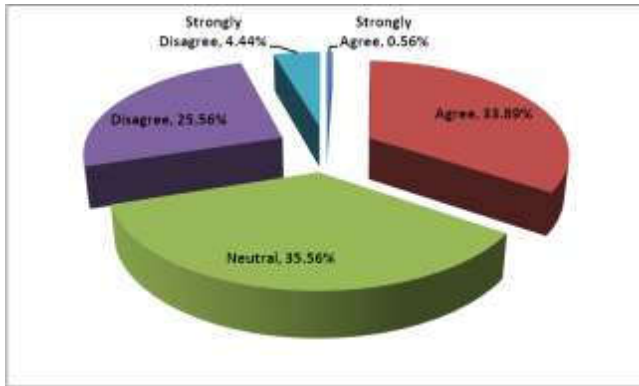


Fig. 5. Percentage of degree level female students who agree that science education influences independent behaviour.

References :

- Anugwom, E.E. Women, "Education and Work in Nigeria." *Educational Research and Review Journal* 4 (2009): 127-134. Retrieved July 4th.
- DeBoer, G. E. (2000). "Scientific literacy: another look at its historical and contemporary meanings and its relationship to science education reform." *Journal of Research in Science Teaching*, 37.6: 582-601.
- Enemou, F.C. (1999). "Gender and Women Empowerment." *In Elements of Politics*, Eds, Anifowose, B. & F. C. Enemou. Lagos: Match House Press Ltd.
- Fadeiye, J.O. and C. E. Olonegan (2001). "Education: a Panacea for Women Empowerment." *Journal of Educational Development* 1.2: 64-69.
- Imogie, A.I. (2002). *Counseling for Quality Assurance in Education*. A keynote address at the 26th Annual Counselling of Nigeria held in University of Benin.