

Gender Differences in Attitude towards the Learning of Agricultural Science in Senior High Schools in the Assin South District of the Central Region, Ghana

Ransford Opoku Darko^{1,2}, Shouqi Yuan¹, Sarah Frema Opoku³, Christina Offei Ansah³, Junping Liu¹
& Nancy Ansah⁴

¹ Research Centre of Fluid Machinery Engineering and Technology, Jiangsu University, Zhenjiang, Jiangsu Province, China

² Department of Agricultural Engineering, University of Cape Coast, Central Region, Cape Coast, Ghana

³ Teaching Practice Unit, University of Cape Coast, Central Region, Cape Coast, Ghana

⁴ Regent University College of Science and Technology, Dansoman, Accra, Ghana

Correspondence: Ransford Opoku Darko, Research Centre of Fluid Machinery Engineering and Technology, Jiangsu University, Zhenjiang, Jiangsu Province, 212013, China. E-mail: chiefrodark@yahoo.com

Received: June 16, 2016

Accepted: July 18, 2016

Online Published: August 15, 2016

doi:10.5539/jas.v8n9p143

URL: <http://dx.doi.org/10.5539/jas.v8n9p143>

Abstract

Agriculture has predominantly been observed as the activity of men with little or no interest by women hence this study was conducted in two public senior high schools in the Assin South district of the Central region of Ghana aimed to investigate gender differences in attitude towards the learning of agricultural science. A sample of 198, comprising of 188 students and 10 teachers of agricultural science took part in the survey. The research instrument used for the data collection was questionnaire which was developed by the researchers in two different forms, one for the agricultural science students and the other for the agricultural science teachers. Research findings from the study indicated that gender had no significant influence on students' attitude towards the learning of agricultural science. Also, the attitude of female students towards agricultural science as a profession is not different from that of the male students. The study again concluded that teachers and parents play a key role influencing students to pursue related science courses. However students should be given the room to express their choice of programme to pursue at the senior high level. It must be reiterated that teachers have a major role to play in increasing and sustaining the interest of students in the study of agricultural science. The study recommends that students especially females should be encouraged, towards building a positive attitude in learning of agricultural science to take up major future roles related to the field.

Keywords: agricultural science, attitude, learning, education, gender

1. Introduction

In Ghana the role of agriculture to the economy cannot be overemphasized. According to Awuku (1991), agriculture helps in boosting up of the economy with the provision of food for the people, provision of foreign currency from the export of agricultural products, income for farmers as well as the provision of employment opportunities. Due to the aforementioned importance of agriculture, experts are needed to be trained in this field, thus, the need to involve agriculture in the curriculum of most educational institutions.

According to Lyson (1981) as cited by Kpiebaya (2012), the school agricultural programme aims to:

- Promote interest and pleasure in agriculture among students so that they can take agriculture as a career,
- Train the students in modern agricultural methods to enable them perform well in their practical examination,
- Train members in leadership and encourage leadership abilities among the students, and
- Develop attitudes of self-help and cooperation among students.

In view of the aforementioned aims, the Ghana Education Services (G.E.S) has also included the study of agricultural science in the curriculum of Senior High Schools. According to the Curriculum Research and

Development Division (CRDD) (2008) of the G.E.S, the general agriculture syllabus is designed to help students:

- Appreciate the importance of agriculture in the socio-economic development of Ghana,
- Acquire decision-making skills through the scientific principles of observation, data collection, analysis and interpretation,
- Develop skills and attitudes required for productive and profitable agriculture through practice and experiential learning,
- Recognise agriculture as a business and a viable livelihood option,
- Develop positive attitudes, interests, habits and good practices in agriculture
- Be aware of the roles of extension service in the agricultural value chain,
- Recognise job opportunities in agriculture,
- Acquire techniques for efficient management of agribusinesses,
- Acquire requisite knowledge and skills needed for further training in agriculture.

The aims of the school agricultural programmes are useful because according to Okigbo (1992), “the future of increased food production rests on giving support to the education and training of young generations who are students of agriculture”. Recruitment and retention of agricultural students at the tertiary level has been historically important (Tarpley & Miller, 2004). However there is a concern about the substantial decline in agriculture science student numbers (Wildman & Torres, 2001). Colleges of agriculture and universities are being challenged to identify new methods of increasing the diversity in their programmes (Gilmore et al., 2006). As increased diversity continues to be a major challenge for most colleges of agriculture, administrators are continually challenged to seek innovative approaches that appeal to potential students especially students from diverse racial and ethnic backgrounds.

Studies completed in the last three decades have shown that girls and boys have different interests and attitudes toward studying science and its related courses including agriculture. These trends are important because, although more females than males enrol in postsecondary institutions and earn higher grades in science and engineering courses, significantly more males than females major in the natural sciences or engineering (Division of Research, Evaluation, and Communication, Directorate for Education and Human Resources, 1996; Keeves, 1991; Kotte, 1992; National Science Board, 1998; Rosser, 1995).

In an examination of data from 19,000 eighth grade students who participated in the National Educational Longitudinal Study, Catsambis (1995) found that males were more likely to look forward to science class and to think science would be useful to their future, and were less afraid to ask questions in science classes than their female peers. Girls’ less positive attitudes, according to Catsambis (1995), existed even though they performed as well or better than boys, receiving better grades in science classes. A study published in 1999 by the Female in Mathematics, Science and Technology in Africa (FEMSA) found that Home Economics was for girls and Woodwork, Metalwork and Technical Drawing for boys only. Agriculture was open for both boys and girls, but girls were underrepresented all the time and this imbalanced trend continues to tertiary level. Squire (2003) reviewed strategies for enhancing women’s full participation in sustainable agricultural development and environmental conservation in sub-Saharan Africa and concluded that a holistic and integrated approach is needed, including gender equality in access to educational opportunities and training programmes for females. Lots of individuals are of the impression that differences in sex have a lot to do with the study of some subjects and to add more salt to injury, some subjects have consciously or unconsciously been classified as belonging excessively to male or female. It has also been observed that in an agricultural science class, male students perform better than their female counterpart however, it is hoped that if both male and female agricultural science students are trained, they could come up with new technological advances, applicable to the Ghanaian economy gearing towards positive stride on global food safety and food security threats. It is in the light of this that this research was conducted to investigate into gender differences in attitudes toward agriculture in the public senior high schools.

2. Methodology

A descriptive survey was used to solicit information from students and teachers. A questionnaire was the instrument used for collecting data for the research. Two different sets of questionnaires were designed. One set was for the students and the other was for the agricultural science teachers of the schools concerned. The questionnaires comprised close-ended items where respondents were provided with a four-point Likert-type scale

made up of the following responses: Strongly Disagree (SD), Disagree (D), Agree (A) and Strongly Agree (SA) to choose from. The population included Senior High School (SHS) students offering agriculture science as an elective subject in the district and agricultural science teachers in those SHS. The researchers used the two SHS in the district that offer agriculture science as an elective subject. The study included students from SHS1, SHS2 and SHS3 with a total population of 200 agriculture science students. The convenience sampling method was used for the selection of 188 students.

Again, the agricultural science teachers from the two SHS were purposively targeted by virtue of their knowledge base in the subject matter and therefore could provide rich information with respect to the topic under investigation. 10 teachers agreed to take part in the study by responding to the questionnaire. Before the research, a pilot test of the questionnaires was done in one school which offered agricultural science, not within the sample selected but in Assin Manso and the results were used to correct some anomalies on the instrument. The data collected were analysed using the Statistical Package for Social Sciences (SPSS version 16.0). Frequencies, percentages, means and standard deviations were used to summarise and analyse the data. Inferential statistics specifically the independent samples T-test was used to determine differences between males and females attitude towards the learning of agriculture science.

3. Results and Discussion

3.1 Background Characteristics of Students

3.1.1 Gender

The gender distribution of the students that took part in the study is represented in Figure 1. It depicts that 142 (76%) of the sampled group were males whilst 46 (24%) were females. The higher percentage of males recorded can be attributed to the fact that few girls are interested in pursuing science related programmes in schools. This is in line with what Catsambis (1995) said males were more likely to look forward to science class and to think science would be useful to their future, and were less afraid to ask questions in science class than their female peers. Again, Keeves and Kotte (1992) stated that males, more than females, were more likely to be enrolled in physics, chemistry and agricultural courses in secondary school.

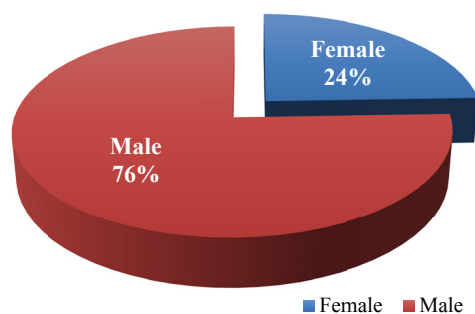


Figure 1. Gender distribution of participants

3.1.2 Place of Stay during School Vacation

As a way of determining if students' place of stay during vacation (demographic) has an influence on their attitude towards the agricultural science profession, the respondents were asked this question 'Where do you stay during school vacation?' and response has been represented in Tables 1 and 2.

Table 1. Place of stay during school vacation

Area	No.	%
Rural	107	56.9
Urban	81	43.1
Total	188	100.0

Table 1 indicates that 107 (56.9%) of the respondents spend their vacation break in the rural area whilst 81 (43.1%) also spend theirs in the urban area. This shows that majority of the students spend their vacations in the rural area which is likely to influence their attitude towards the agricultural science career. However, a further analysis as shown in Table 2 (cross tabulation) reveals that, most of students who spend their holidays in the rural area (n = 84.44%) and the urban area (n = 69.37%) have positive attitude towards the agricultural profession as both disagreed that 'agricultural science will not be important to me in my life's work'. On the other hand, some students, especially those who spend their holiday in rural area (n = 23) agreed to the statement 'Agricultural science will not be important to me in my life's work'. This means that a few of the students do not see the relevance of studying agricultural science in their future career.

Table 2. Cross tabulation of place of stay during vacation against attitude to towards agricultural science profession

			Agricultural science will not be important to me in my life's work.			
			Strongly Disagree	Disagree	Agree	Strongly Agree
Where do you stay during holidays	Rural	Count	70	14	10	13
		% within agricultural science will not be important to me in my life's work.	56.0%	50.0%	62.5%	68.4%
	Urban	Count	55	14	6	6
		% within agricultural science will not be important to me in my life's work.	44.0%	50.0%	37.5%	31.6%
Total		Count	125	28	16	19
		% within agricultural science will not be important to me in my life's work.	100.0%	100.0%	100.0%	100.0%

3.2 Background Characteristics of Teachers

3.2.1 Gender

The gender of teachers who took part in the study has also been represented in Table 3.

It showed that majority of the teachers 9 (90%) are males as against only one female agricultural teacher among the sampled SHS indicating that number of female teachers in agricultural science is very low as compared to their male counterparts. This is likely to influence female students' appreciation of the agricultural programme as there are few female teachers to motivate them or serve as role models.

Table 3. Gender of teachers

Gender	No.	%
Male	9	90.0
Female	1	10.0
Total	10	100.0

3.3 Gender Attitude of Students towards the Learning of Agricultural Sciences

It is evident from the results (Table 4) that both male and female agricultural science students generally have a positive attitude towards the learning of agricultural science in senior high schools in the Assin South District. As an indication, students agreed to statements such as: *I like agricultural science, I will pursue an agriculture related programme after leaving school* and *Girls can perform just as boys in agriculture science*. In the same vein, the students also disagreed to statements such as: *Agriculture science has been my worst subject, agriculture science is difficult for me, agriculture science is not important for my life* and *Studying agriculture science is a waste of time*.

Table 4. Gender attitude of students towards the learning of agricultural science

Attitude	Gender				Total	
	Female		Male		Mean	Std. Dev.
	Mean	Std. Dev.	Mean	Std. Dev.		
I like agricultural science	3.6304	.82620	3.7958	.51280	3.7553	.60632
Agriculture science is very interesting	3.6087	.77397	3.7183	.51041	3.6915	.58550
I am sure I can learn agriculture	3.2609	1.12417	3.5211	.84818	3.4574	.92690
Agriculture science has been my worst subject	1.8043	1.18546	1.7183	1.02013	1.7394	1.06029
Agriculture science is difficult for me	1.4565	.75149	1.7183	1.01315	1.6543	.96052
Agriculture science is not important for my life	1.6087	.90623	1.6620	1.05781	1.6489	1.02072
I am not good in agriculture science	1.9348	1.08325	1.7746	1.03413	1.8138	1.04570
I will pursue an agriculture related programme after leaving school	2.9783	1.29081	3.0986	1.11921	3.0691	1.16109
Studying agriculture science is a waste of time.	1.5652	.91049	1.4507	.80405	1.4787	.83029
I cannot get good grades in agricultural science	1.8913	1.19682	1.5704	.92559	1.6489	1.00488
Males are not naturally better than females in agriculture science	2.5652	1.32752	2.1479	1.11054	2.2500	1.17744
Girls can perform just as boys in agriculture science	2.8478	1.31601	2.9296	1.18888	2.9096	1.21810
Answers given by boys to agriculture science problems are more accurate than girls	1.9348	1.10357	2.2817	1.18121	2.1968	1.16939
Answers given by girls to agriculture science problems are just as accurate as those given by boys.	2.6304	1.14229	2.5986	1.16728	2.6064	1.15826
Females are just as good as males in agriculture science	3.2609	1.21901	2.9366	1.10585	3.0160	1.13983

Note. * m=mean (Standard mean = 2.5).

The relationship between the attitudinal disposition of male and female agricultural science students towards the learning of the subject as a subject in the sampled schools was determined through an independent T-Test analysis and the result is shown in Tables 5 and 6.

Table 5. Group statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Attitude towards learning agric.	Female	46	36.98	4.085	.602
	Male	142	36.92	5.694	.478

Table 6. Independent T-Test analysis of attitudinal difference between male and female students towards the learning of agricultural science

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference	
									Lower Bound	Upper Bound
Gender attitude towards learning of agricultural science	Equal variances assumed	1.802	.181	.061	186	.951	.056	.908	-1.73	1.84
	Equal variances not assumed			.072	106.06	.942	.056	.769	-1.46	1.58

The result indicates that the Sig. value (0.18) is greater than the alpha value (0.05), it is therefore apparent that there is no statistically significant difference between male and female attitudes towards the learning of agricultural science. In other words, the attitude of female students ($M = 36.98$, $SD = 4.085$) towards the learning of agricultural science is not different from that of the male students ($M = 36.92$, $SD = 5.694$; $t(186) = 0.061$, $p = 0.951$). The implication of this result is that interest and performance in the subject does not necessarily depend on gender as both male and female are favourably disposed to the subject.

This study has revealed that gender had no significant influence on students' attitude towards the learning of agricultural science. Though gender influences attitudes to some subjects especially science subjects is still controversial (Weimburg, 1995), there is reasonable consensus that boys appear to perform better than girls in certain subject areas especially the science related ones (Falaye & Ayoola, 2006).

Table 7. Gender attitudes of students towards agricultural science profession

Attitude	Gender				Total	
	Female		Male		Mean	Std. Dev.
	Mean	Std. Dev.	Mean	Std. Dev.		
Studying agricultural science will help me earn a living	3.1522	1.22868	3.6338	.73878	3.5160	.90439
Agricultural science will not be important to me in my life's work.	1.7826	1.19095	1.5704	.94078	1.6223	1.00848
I will need agricultural science for my future work.	2.8696	1.29286	3.5563	.79470	3.3883	.98289
I do not expect much from agricultural science when i leave school.	2.0000	1.11555	1.8873	1.03210	1.9149	1.05120
I will use agricultural science in my ways as an adult	3.2174	.96409	3.3099	.90846	3.2872	.92062
I cannot have a good job with agricultural science	1.7174	.93483	1.8944	1.17121	1.8511	1.11822
I will need a good understanding of agricultural science for my future work.	3.1957	1.12782	3.4155	.80109	3.3617	.89384
Careers in agricultural sciences touch the lives of all people each day	3.3043	.98589	3.3732	.91952	3.3564	.93398
Our nation is dependent on people who work in agricultural science	3.5652	.77895	3.9648	4.27994	3.8670	3.74000
I know little about jobs or careers in the agricultural sciences	3.1522	.96534	3.4366	3.54798	3.3670	3.11944
I personally know someone who has a career in agricultural science.	3.5652	.74988	3.3944	.84180	3.4362	.82161
When i hear the word agricultural science, i usually think of farms with crops and animals	1.8043	1.14736	2.0423	1.20797	1.9840	1.19480

Note. * m = mean (Standard mean = 2.5).

Table 7 shows the attitude of agricultural science students (ie. male and female) towards the agricultural science Profession. The result indicates that students have generally a positive attitude towards the agricultural science. Besides, the positive attitude towards the profession, they also acknowledged that the nation is dependent on people whose works are related to agricultural science. It can also be inferred from the results (Table 5) that the attitude of the male students to the subject of agricultural science does not differ significantly from their female counterparts as the mean difference between the two sexes did not differ much. However, a wider mean difference (0.7) was recorded for the statement 'I will need agricultural science for my future work'. This means that most of the male students are of the view that they need agricultural science for their future work than the females students.

The relationship between the attitudinal disposition of male and female agricultural science students towards agricultural science as a [future] profession among the sampled students was determined through an independent T-Test analysis and the result is presented in Tables 8 and 9.

Table 8. Group statistics

	Gender	N	Mean	Std. Dev.	Std. Error Mean
Attitude towards Agric. Profession	Female	46	33.33	4.614	.680
	Male	142	35.48	6.914	.580

Table 9. Independent T-Test analysis of attitudinal difference between male and female students towards agricultural science as a profession

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Diff.	
Gender attitude towards agricultural science profession	Equal variances assumed	.166	.684	-1.973	186	.050	-2.153	1.091	-4.306	.000
	Equal variances not assumed			-2.408	114.862	.018	-2.153	.894	-3.924	-.382

The implication of this result is that interest in furthering their career/profession in agricultural science does not depend on gender as both male and female agreed that the subject is important in future life and a useful subject that is worth pursuing.

Table 10 depicts the motivation behind respondents' choice of agricultural science as a programme of study in the senior high school. Majority 133 (70%) of the respondents indicated that their choice to pursue agricultural science was a personally motivated. A few as 34 (18%) also indicated that they were motivated by the economic gains in studying agricultural science. Other reasons for studying agricultural science as indicated by the respondents include: School (6%), Social (4%) and Family (2%). However, none of the females sampled in the study mentioned that their motive for studying agricultural science was motivated by the family.

This means that greatest motivation of students to study agricultural science in the senior high schools comes from the students themselves. In other words, it was a personal decision to study agricultural science.

Table 10. Reasons for enrolling in agricultural science education

Reason	Gender				Total	
	Female (No.)	%	Male (No.)	%	No.	%
Personal	31	16	102	54	133	70
Economic	10	5	24	13	34	18
School	4	2	7	4	11	6
Social	1	1	6	3	7	4
Family	0	0	3	2	3	2
Peer Pressure	0	0	0	0	0	0
Total	46		142		188	100

3.4 Individuals Influencing Students' Choice of Agricultural Science

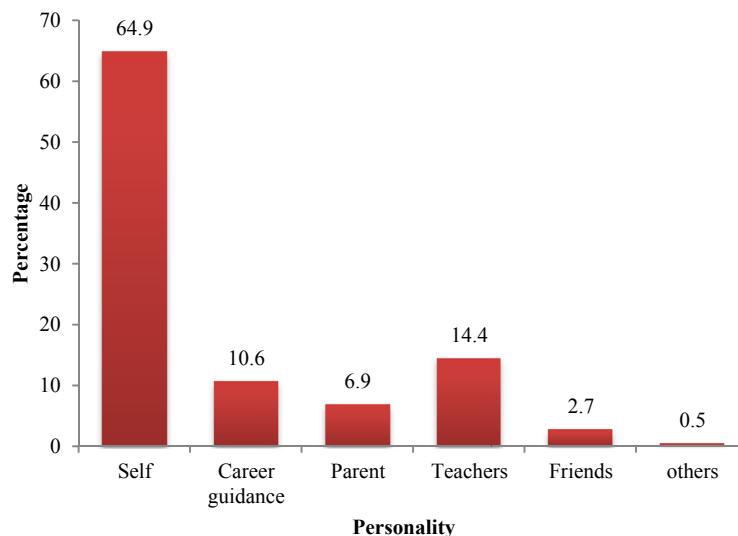


Figure 2. Individuals influencing students' choice of agricultural science

Figure 2 shows the individuals who influenced the respondents to read agricultural science in the senior high school. A greater percentage (65%) of the respondents were self-influenced to pursue agricultural science. Others were influenced by their teachers (14%), career coach (11%), parents (10%) and friends (3%). This indicates that the students themselves and their JHS teachers played a key role in influencing students to study agricultural science. Also parents influence their children to some extent in their choosing of agricultural science as a subject to pursue in the senior high school. This is contrary to the findings of Darko et al. (2015) who said that parents discourage their wards from pursuing agricultural science because they think it has no future. The result shows that teachers contribute a lot in the influence of students towards the learning of agricultural science especially by motivating students in the programme they are studying.

4. Conclusions

- Based on the findings of the study, it can be inferred that gender had no significant influence on students' attitude towards the learning of agricultural science in Senior High Schools in the Assin South District of the Central Region of Ghana.
- It can also be concluded that there is no statistically significant difference between male and female attitudes towards agricultural science as a profession. In other words, the attitude of female students towards agricultural science as a profession is not different from that of the male students. This implies that interest in furthering career in agricultural science does not depend on the gender of students.
- The study again concluded that teachers and parents play a key role influencing students to pursue science courses such as agricultural science in the SHS. However students should be given the room to express their choice of programme to pursue at the senior high level. Also teachers have a major role to play in increasing and sustaining the interest of students in the study of agricultural science in the senior high schools in the Assin South District.

Acknowledgements

We greatly appreciate the careful and precise reviews by the anonymous reviewers and editors. The authors are greatly indebted to the National Natural Science Foundation of China (number 51309117), the Program for National Hi-Tech Research and Development of China (863 Program, number 2011AA100506). We are also grateful to the teaching practice unit, University of Cape Coast for their support in this research work.

References

Awuku, K. A. (1991). *Agricultural and Environmental Studies*. London: Rebl. Evans Brothers Ltd.

- Catsambis, S. (1995). Gender, race, ethnicity, and science education in the middle grades. *Journal of Research in Science Teaching*, 32, 243-257. <http://dx.doi.org/10.1002/tea.3660320305>
- Curriculum Research and Development Division [CRDD]. (2008). *National syllabus for agricultural science for senior high schools*. Accra: Author.
- Darko, R. O., Offei-Ansah, C., Shouqi, Y., & Jun-ping, L. (2015). Challenges in teaching and learning of agricultural science in selected public senior high schools in Cape Coast Metropolis. *Science and Education Centre of North America*, 3(1), 13-20.
- Falaye, F. V., & Ayoola, R. A. (2006). Home variables, attitudes and gender correlates of secondary school students' cognitive achievement. *Global Journal of Educational Research*, 5(1), 39-42.
- Female Education in Mathematics, Science and Technology in Africa Swaziland. (1999). *Report on the School Study project*. Manzini: FEMSA Swaziland.
- Gilmore, J. L., Goecker, A. D., Smith, E., Boetler, F. E., Gonzalez, J. A., Mack, T. P., & Whitaker, A. D. (2006). *Shifts in the production and employment of Baccalaureate Degree Graduates from U.S. Colleges of Agriculture and Natural Resources, 1990-2005*. Washington, DC: United States Department of Agriculture.
- Keeves, J., & Kotte, D. (1992). Disparities between the sexes in science education: 1970-84. In J. Keeves (Ed.), *The IEA study of science III*. New York: Pergamon.
- Kotte, D. (1992). *Gender differences in science achievement in 10 countries*. Frankfurt: Peter Lang.
- Kpiebaya, F. (2012). *Gender differences in attitude towards the learning of agricultural Science in Senior High Schools in the Jomoro District* (Unpublished PGDE dissertation). University of Cape Coast.
- Lyson, T. A. (1981). *Revision of paper presented at the annual meeting of Rural Sociologist Society* (p. 25). Guelph, Ontario, Canada.
- National Science Board. (1998). *Science and engineering indicators—1998*. Arlington, VA: National Science Foundation.
- Okigbo, P. (1992). *Assessment of structural adjustment programme in Nigeria (1988-9)*. A paper presented at National Conference on Social transformation for Self-reliance. Benin City, Nigeria
- Rosser, S. (Ed.). (1995). *Teaching the majority*. New York: Teachers College Press.
- Squire, P. J. (2003). Strategies for enhancing women's full participation in sustainable agricultural development and environmental conservation in sub-Saharan Africa. *Journal of International Agricultural and Extension*, 10(1), 5-10.
- Tarpley, R. S., & Miller, R. L. (2004). Factors associated with the choice of college major. *NACTA Journal*, 48(2), 13-16.
- Weinburgh, M. (1995). Gender differences in student attitudes toward science: A meta-analysis of literature from 1970 to 1991. *Journal of Research in Science Teaching*, 32(4), 387-398. <http://dx.doi.org/10.1002/tea.3660320407>
- Wildman, M., & Torres, R. (2001). Factors identified when selecting a major in agriculture. *Journal of Agricultural Education*, 42(2), 46-55. <http://dx.doi.org/10.5032/jae.2001.02046>

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).