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Full Length Research Paper

Attitudes of educators regarding the implementation of technology education in schools

J.A.T. Tholo

[1]Department of Education, North West Province, South Africa

E-mail: JTholo@nwpg.gov.za

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This article aims at giving a snapshot of the attitudes of educators regarding the implementation of Technology education in schools. The questionnaire was employed to gather data about the attitude of educators towards the implementation of technology education in the North West Province. The questionnaires were then analyzed using the Statistical Package for Social Sciences (SPSS). The educator attitudes and construct of technology were discovered to be crucial for the implementation of technology in schools. Most respondents indicated that educators need to be well trained; materials need to be made available for both educators and learners.

Keywords: Attitude, educators, technology education, North West Province.

INTRODUCTION

The successful implementation of the Technology curriculum is dependent on educators at all levels having a solidly established personal construct of technology, which is equivalent with that of the curriculum. The impact of conceptions, beliefs, views and attitudes of educators on the successful implementation of curricula is well established Mawson (1999:5). There have been a number of studies, which have identified affective links between personal construct and practice, but little research as to how this may change over time. The extent to which the views of educators about the nature of Technology can be reconstructed is of great concern to curriculum support specialists at the in-service level.

In an examination of the dimensions of technology, Custer (1995:7) argued that there is a critical need for all individuals to develop at least minimal levels of understanding of Technology as it had a profound influence on all parts of human life in the world. The implications for this is that educators themselves must have a knowledge and understanding of technology and possess knowledge of appropriate teaching and learning strategies that will enable learners to achieve these minimum levels of understanding of Technology.

The world of Technology has always been associated with males in South Africa and other countries. It is unfortunate that since 1994, when the democratic era dawned, education system that is now based on principles of democracy such as, non-racial and non-sexist, Technology is still seen as male's area of competency. Haynie, (2003:14)) states that since the early 1980's, a curriculum known as Technology Education has evolved from the earlier industrial arts. Industrial arts had failed to attract many female students or educators but there were some early indicators that the more contemporary technology curriculum would be, more females would be attracted. He continues to say changes in society have made women feel more accepted in traditionally male dominated professions and redefined acceptable behaviour of both males and females in social interactions. Haynie concluded that following his survey and experience of thirty six years, women are generally well accepted and comfortable in the technology education profession but there are some problems that make them feel isolated, patronized, minimized, conspicuous or otherwise uncomfortable.

It is against that background that the way educators think of teaching technology will impact on their actual teaching and finally on the learners. It must be borne in mind that to a large extent, how an educator feels and thinks of teaching has a lot to do with how they were taught and also how the concerned learners will feel about that subject. The gender variable cannot be overemphasized, as it is an important predictor of attitudes towards technology- the same way it is in predicting attitudes towards science. Already at the age of 10, extreme differences between boys and girls can

be noticed in their attitudes towards technology. As pupils grow older, these differences do not seem to disappear. (de Klerk Wolters, 1998:4). There is therefore a concern that unless this situation is somehow addressed, there will always be a gender bias towards males regarding technology education

Theoretical framework

Constructivism is an approach to cognitive development in which learners discover all knowledge about the world through their own activity (Berk, 2000:645). It is based on a combination of a subset of research within cognitive and social psychology. Dewey is considered to be the founder philosopher of this approach (Huitt, 2003:1). In constructivism knowledge is not a fixed object; it is constructed by an individual through his/her own experiences of that object (Hsiao, 2007:3; Doolittle and Camp, 2007:17).

Doolittle and Camp (2007:17) see constructivism in the following manner:

"*Constructivist pedagogy acknowledges the learners' active role in the personal creation of knowledge, the importance of experience (both individual and social) in this knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality. These four fundamental tenets provide the foundation for basic principles of the teaching, learning, and knowing process as described by constructivism"*

Dewey stressed the importance of having the learners' experience grow from experience. Knowledge and ideas came only from a situation where learners had to draw them out of experiences that had meaning and importance to them (Epstein, 2002:5). These situations have to occur in a social environment, where learners could come together to analyze materials and to create a community of learners who held their knowledge together.

Piaget believed that the fundamental basis of learning was discovery (Epstein, 2002:6). The said researcher goes on to say

"*To understand is to discover, to reconstruct by discovery, and such conditions must be complied with if in the future individuals are to be formed who are capable of production and not simply repetition"*

The focus of Piaget's theory is the various reconstructions that an individual is thinking goes through in the development of logical reasoning. Vygotsky believed that children learn concepts from their everyday notions and adult concepts. He felt that learners need to be guided by adults, but he also thought that it was very important for the learner to be influenced by their peers as well as discover things on their own (Epstein, 2002:6). He termed this the zone of proximal development. These supports that learners receive from peers and adults are gradually removed as learners develop autonomous learning strategies, thus promoting their own cognitive, affective and psychomotor learning skills and knowledge.

Bruner's major ideas was that learning was an active, social process in which learners construct new ideas or concepts based on their current knowledge. He also advocated that the instructors should try and encourage learners to discover principles by themselves (Chen, 2007:3). According to Huitt (2003:2) Bruner provides the following principles of constructivist learning:

- Instruction must be concerned with experiences and contexts that make the learner willing and able to learn (readiness);
- Instruction must be structured so that it can be easily grasped by the learner (spiral organization); and
- Instruction should be designed to facilitate extrapolation and fill in the gaps (going beyond information given).

Constructivism provided the theoretical framework for this study because learning by doing and simulations of occupations are the basis for much of the instruction in Technology education. Although constructivism is not a theory of teaching, it suggests taking a radically different approach to instruction from that used in most schools. The best way to learn is not from lectures, but by letting learners construct knowledge for themselves. Learners should have a constructivist educator along with a constructivist classroom to help them discover new things for themselves. Constructivism promotes increased social interaction and discussion in the classroom, both between educators and learners and between learners.

Problem statement and motivation

Technology Education needs educators who are motivated to teach and learn it. This means that educators who are involved in the teaching of technology need to have the right attitude towards its implementation. This research proposed to identify the elements that influence the attitude of educators towards the implementation of technology in schools. Many educators need assistance to clarify and reflect on their own perceptions of Technology.

METHODOLOGY

According to Leedy (1993:121), methodology refers to merely an operational framework within which the facts are placed so that their meaning may be seen more clearly. Hussey and Hussey (1997:54) view methodology as an overall approach to the research process, from the theoretical underpinning to the collection and analysis of data. The said authors go on to say:

"Methodologies refer to the overall approach of the research process, from the theoretical underpinning to

the collection and analysis of data. Like theories, methodologies cannot be true or false, only more or less useful."

Neuman (1997:68) sees interpretive methodology as:

"*the systemic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds"*.

For interpretive researchers, social reality is based on people's definition of it. They see social reality as consisting of people who construct meaning and create interpretations through their daily social interaction. Neuman (1997:73) argues that the interpretive methodology is the foundation of social research techniques that are sensitive to context. Gultig, Lubisi, and Wedekind (1999:80) are of the opinion that interpretivism has a local rather than global orientation that is concerned more with the nature bound frameworks of particular institutions and the ways individuals understand and act in the particular social contexts.

According to Patton (1990:20), quantitative research is a formal, objective, systematic process in which numerical data are utilized to obtain information about the world. In the quantitative approach, standardized measurement procedures are used to assign numbers to observations, and statistics are used to summarize the results (Dooley, 1990:288; Neill, 2004:1). The quantitative researcher believes that the best way of measuring the properties of a phenomenon (e.g. the attitudes of individuals towards certain topics) is through quantitative measurement (Babbie and Mouton, 2001: 49). Quantification makes the observation more explicit (Babbie, and Mouton 2001:32). In this study, questionnaires were used for quantifying the attitudes of educators towards Technology. The selection of educators followed a simple random sampling, based on the number of educators in each region. The list of all Technology educators was requested from the area project offices of each of the five education regions. Based on the list supplied per region they were randomly sampled. A total of 344 educators completed the questionnaire.

Literature Study

The mindsets of many educators need to change, so that principles of democracy which include among others; gender-sensitivity may be realized in a true sense. If education is to reach its noble goals, there ought to be movement towards a stage where the females feel very much part and parcel of the environment in which they are confident enough to handle Technology (Nkotsoe, 2004:3). It is only when such educators show confidence that even female learners could be encouraged to follow such line of education and eventually conquer the world of work in Technology related occupations which were initially associated with males. In addressing the whole imbalance, Wolters (1989:9) suggests that from the perspective of attitude formation, it is important to start Technology education at an early age. This means that it is appropriate to pay attention to Technology in the initial training of primary school educators and/or as part of an in-service training. Learners ought to be taught a "broad concept of Technology" because there is a positive relation between having a broad concept of Technology and positive affection towards Technology (Nkotsoe, 2004:4).

Research studies have revealed that the past experiences of primary and secondary educators greatly influence their understandings of Technology. In particular, research conducted into primary educators' understandings of Technology indicated that they possessed narrow views of Technology (Mawson, 2002:9). These views influenced the ways in which they attempted to implement Technology. In her findings the said researcher indicated that primary educators tended to conceptualize Technology as having to do with computers, or very technical and advanced machinery that they could not possibly incorporate into their classroom without expertise.

Mawson (2002:9) also found out that the subjects they teach influence secondary educators' perceptions of Technology. Educators' understanding of the differences between Science and Technology is also a problem. Many educators see Technology as the application of Science and therefore need assistance to clarify and reflect on their own perceptions of Technology. It would seem to be important for educators implementing Technology to develop perceptions of Technology that is in accordance with the purpose of the Revised National Curriculum Statements (DoE, 2002:4).

Outcomes of the research

The purpose of this research was to establish empirically the educators' attitudes towards Technology. The variables considered in the study are shown in Table 1:

The above factors are subsequently discussed. According to Table 1, Item 1, 332 respondents (96.5%) agreed and strongly agreed that Technology is very important in life. Again 93.9% agreed that a female can have a technological career as much as a male as shown in Item 2 of Table 1. This is a positive finding in the sense that Technology was previously seen as a predominantly male career. There is almost a tie between respondents who believe that males are able to repair things better than females and those who disagree. In Item 3, 51.2% of the participants do not agree with this statement.

Item 4 of Table 1 indicates that there is almost half of the respondents (52.3%) disagree that to understand

T**able 1:** Variables of educators' attitudes towards Technology

	D		SD		A		SA		MISSIN		TOTAL	
	f	%	f	%	f	%	f	%	f	%	f	%
1. Technology is very important in life	6	1.7%	4	1.2%	118	34.3%	214	62.2%	2	0.6%	344	100%
2. A female can have a technological profession just as well as a male	12	3.5%	9	2.6%	116	33.7%	206	59.9%	1	0.3%	344	100%
3. Males are able to repair things better than females	108	31.4%	68	19.8%	105	30.5%	63	18.3%	0	0	344	100%
4. To understand something of technology you have to take a difficult training course	180	52.3%	86	25%	43	12.6%	32	9.4%	3	0.9%	344	100%
5. I need support in order to teach technology effectively	16	4.7%	15	4.4%	144	41.8%	165	47.9%	4	1.2%	344	100
6. Technology related activities are difficult to understand	155	45.3%	76	22.2%	85	24.9%	26	7.6%	2	0.6%	344	100%
7. Technology is always bad for the environment	186	54.1%	105	30.5%	26	7.6%	27	7.8%	0	0	344	100%
8. Males know more than females about technology	131	38.2%	98	28.6%	75	21.9%	39	11.4%	1	0.3%	344	100%
9. I like to read technology magazines	40	11.7%	27	7.9%	196	57.5%	78	22.9%	3	0.9%	344	100%
10. Technology is as difficult for females as it is for males	106	30.9%	76	22.2%	100	29.2%	61	17.8%	1	0.3%	344	100%
11. I am highly motivated to teach technology	30	7.6%	25	7.3%	176	51.6%	114	33.4%	3	0.9%	344	100%
12. My training at college/university prepared me to teach technology	130	38.6%	73	21.7%	73	21.7%	61	18.1%	7	2%	344	100%
13. Most learners I teach perform well in technology	58	17.2%	43	12.7%	192	56.8%	45	13.3%	6	1.7%	344	100%
14. Unavailability of tools and equipment demotivate learners	43	12.7%	52	15.3%	114	33.6%	130	38.3%	5	1.4%	344	100%
15. Administration does not provide necessary resources for educators	58	17.2%	48	14.2%	129	38.3%	102	30.3%	7	2%	344	100%
16. Time allocated to teach technology is enough to prepare learners for exam	100	29.4%	91	26.8%	110	32.4%	39	11.5%	4	1.2%	344	100%
17. Learners' abilities are not limited by the facilities available	68	20.2%	69	20.5%	156	46.4%	43	12.8%	8	2.3%	344	100%
18. Reading and writing capabilities of learners affect performance in technology	85	25.1%	46	13.6%	136	40.1%	72	21.2%	5	1.4%	344	100%
19. Technology should be excluded from the curriculum	127	37.5%	155	45.7%	19	5.6%	38	11.2%	5	1.4%	344	100%

something in Technology you have to do a difficult course. Three hundred and nine respondents (89.7%) agreed that they need support to teach Technology effectively. This is indicated in Item 5 of Table 1. In Item 6 of Table 1, 231 respondents (67.5%) are of the opinion that Technology related activities are not difficult to understand. Only 111 respondents (32.5%) agreed that these activities are difficult to understand. According to Table 1, Item 7, 291 respondents (84.6%) do not agree that Technology is always bad for the environment. This is a positive finding in the sense that the respondents understand the impact of Technology on the environment. This means that half of the educators who were sampled feel confident about Technology and another half feel that Technology activities are difficult for them. According to Kimbell, Stables, Wheeler, Wosnak and Kelly (1998:20), the attitudes of educators about the place of creativity in schools are mixed. This is also a finding from the interviews that in schools where Technology is implemented best educators have a positive attitude. Educators' attitudes are sometimes recognized as being a powerful motivating force for

educators and learners. It can also be a vehicle for high level of individualized achievement.

In Table 1, Item 8, 229 respondents (66.8%) do not agree that males know more about Technology than females. The remaining 114 respondents (33.2%) agree that males are better at Technology than females. It is pleasing to see that 274 respondents (80.4%) indicated that they like to read Technology magazines as indicated in Item 9. The remaining 67 respondents (19.6%) do not like to read Technology magazines. This implies that most respondents have interest in Technology by reading the magazines. If interest is the educators' strength we need to allow them to make a start on Technology projects and build on their confidence (Stables, 1997:13). The American Association of University Women (AAUW, 1992:12) found that research spanning the past twenty years consistently reveals that males receive more attention than do females. Following their research the following were their findings:

- In middle schools, girls appeared to enjoy Technology education and have confidence in their abilities;
- Most of the educators felt that transition from industrial arts to Technology education makes the learning area more attractive to girls, since there is less emphasis on the use of heavy equipment
- In classroom observation and focus group interviews, evidence was found that girls may respond more positively to some aspects of Technology education classes. While some educators spoke of gender-neutral projects, many of the projects being built are more likely to be attractive to boys.
- Looking at the factors that discouraged both boys and girls from taking Technology education, many factors had a particularly strong impact on girls. The lack of knowledge of technological careers, failure to connect what students were doing in class with future careers and the lack of a sense of economic realities were particularly discouraging to girls because they had less information about Technology from experiences outside of school.

One hundred and eighty two respondents (53%) indicated that they agree that Technology is as difficult for males as it is for females. The remaining 161 respondents (47%) did not agree with the said statement. This is indicated in Item 10 of Table 1. In Item 11 of Table 1, 290 respondents (85%) indicated that they are highly motivated to teach Technology. The remaining 55 respondents (14.9%) indicated that they are not highly motivated or they have a low morale. According to Table 1 Item 12, only 134 respondents (39.7%) indicated that their training prepared them to teach Technology. However, 203 respondents (60.3%) indicated that their training did not prepare them to teach Technology. Two hundred and thirty seven respondents (70.1%) in Table 1, Item 13 agree that most of the learners they teach perform well in Technology. The remaining 101 respondents (29.9%) did not agree with the statement. According to Item 14 of Table 1, 244 respondents (71.9%) agreed that the shortage of tools and equipment demoralizes learners. The remaining 95 respondents (28.1%) do not agree with this statement. Item 15 indicates that 231 respondents (68.6%) agree that they do not have sufficient resources. Only 106 respondents (31.4%) indicated that they have sufficient resources. In Item 16 it is shown that 149 respondents (43.8%) agree that time allocated to teach Technology is enough to prepare learners for examinations. However, 191 respondents (56.2%) do not agree that time is sufficient. In grade 9, learners write their Common Tasks of Assessment (CTA) examinations which makes them to qualify for the General Education and Training Certificate (GETC). It was discussed in the literature review that such examinations count for 25% of the final mark.

One hundred and ninety nine respondents (59.3%) in Table 1 (Item 17) indicated that the availability of physical facilities do not limit the abilities of learners. However, the remaining 137 respondents (40.7%) do not agree with the statement. Two hundred and eight respondents (61%) agree that learners who cannot read and write do not perform well in Technology. Only 131 respondents (31%) did not agree with the statement. This is indicated in Item 18 of Table 1. Also according to Table 1 (item38), 282 respondents (83.2%) indicated that Technology should not be removed from the curriculum. However, the remaining 57 respondents (16.6%) felt that Technology should not be part of the curriculum. It is encouraging to note that despite the challenges that surround Technology, most educators still feel that it is an important aspect of the curriculum.

The chi-square tests were also analyzed on the educators' attitude questionnaire. According to Ary, Jacobs and Razavieh (1990:209), a chi-square test is used to determine the level of significance among the proportion of respondents. Only those questions that had a significant difference (Pearson chi square value being less than 0.005) have been taken into consideration. The results are subsequently discussed.

Excel software package was used to perform a chi-square test for the data in Table 2.

The chi-square statistic and the p-value with three degrees of freedom were 24,3 and 0,000, respectively. Since the p-value is less than 1% level of significance, then the perception of educators about repairing things is significantly dependent on the gender of the educator. It means that the majority (45/63 = 71 %) of the educators who tend to strongly agree that males are able to repair things better than the females are the male educators, whereas the majority (42/68 = 62%) of the educators who tend to strongly disagree are the female educators. Figure 1 below justifies this research finding.

Table 2: Males are able to repair things better than females

	Males are able to repair things better than females				
Gender	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Total**
Male	26	44	65	45	180
Female	42	64	40	18	164
Total	68	108	105	63	344

Chi-square = 24,3 df = 3 p-value = 0,000

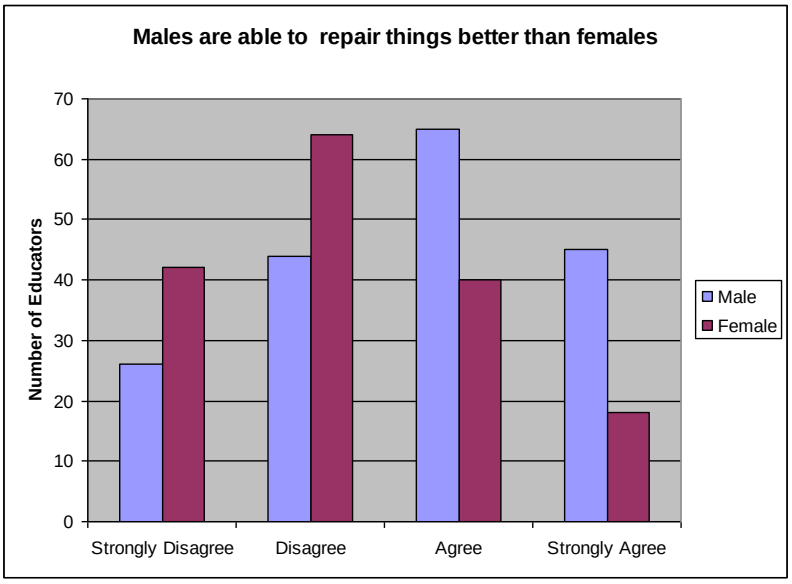

Figure 1: Males are able to repair things better than females

Table 3: Males know more about technology than females

	Males know more about technology than females				
Gender	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Male	36	68	55	21	180
Female	62	63	20	18	163
Total	98	131	75	39	343

Chi-square = 22,87 df = 3 p-value = 0,000

Excel software package was used to perform a chi-square test for the data in Table 3.

The chi-square statistic and the p-value with three degrees of freedom were 22,87 and 0,000, respectively. Since the p-value is less than 1% level of significance, then the perception of educators about the knowledge of technology is significantly dependent on the gender of the educator. It means that the majority (55/75 = 73%) of the educators who tend to agree that males know more about technology are the male educators, whereas the majority (62/98 = 63%) of the educators who tend to strongly disagree are the female educators. Figure 2 below justifies this research finding

Excel software package was used to perform a chi-square test for the data in Table 4.

The chi-square statistic and the p-value with three degrees of freedom were 9,11 and 0,028, respectively. Since the p-value is less than 5% level of significance, then the perception of educators about technology training at university/college is significantly dependent on the gender of the educator. It means that the majority (41/73 = 56%) of the educators who tend to agree that their training at university/college prepared them to teach technology are the female educators, whereas the majority (49/73 = 67%) of the educators who tend to strongly disagree are the male educators. Figure 3

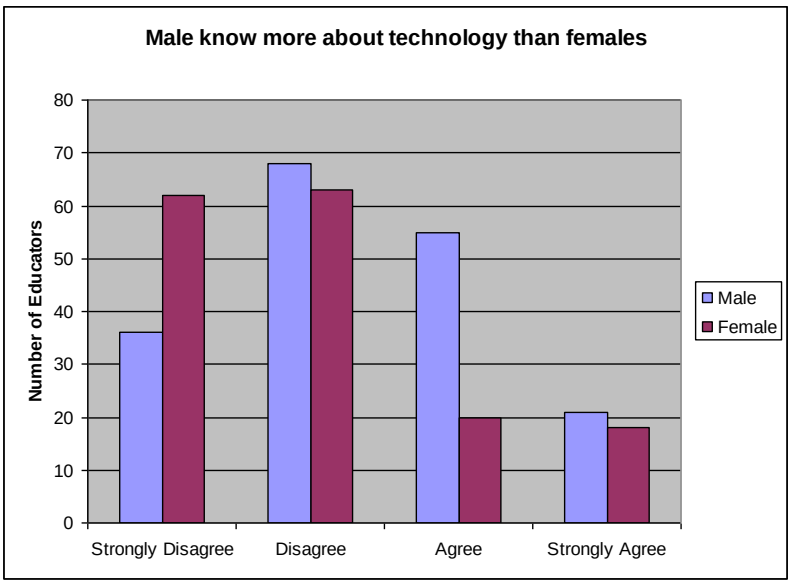

Figure 2: Males know more about technology than females

Table 4: My training in college/university prepared me to teach technology

	My training in college/university prepared me to teach technology				
Gender	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Male	49	67	32	29	177
Female	24	63	41	32	160
Total	73	130	73	61	337

Chi-square = 9,11 df = 3 p-value = 0,028

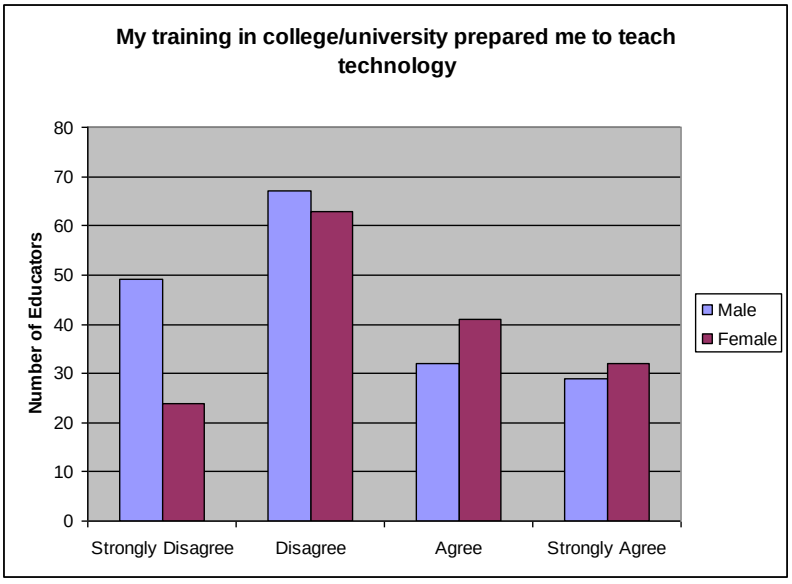

Figure 3: My training in college/university prepared me to teach technology

justifies this research finding.

Excel software package was used to perform a chi-square test for the data in Table 5.

The chi-square statistic and the p-value with three degrees of freedom were 9,52 and 0,023, respectively.

Table 5: I need support in order to teach technology effectively

	I need support in order to teach technology effectively				
Type of settlement	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Total**
Rural	14	8	86	113	221
Urban	1	8	58	52	119
Total	15	16	144	165	340

Chi-square = 9,52 df = 3 p-value = 0,023

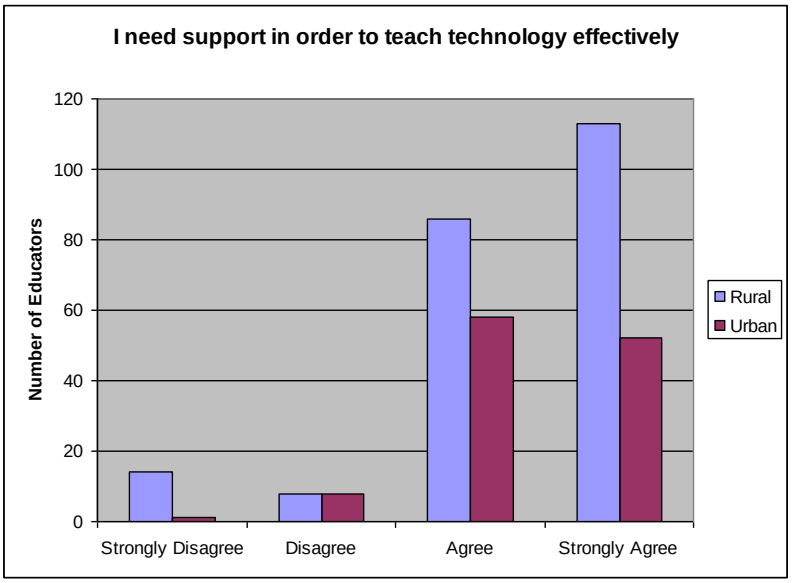

Figure 4: I need support in order to teach technology effectively

Table 6: To understand something in technology you have to take a difficult training course

	To understand something of technology you have to take a difficult training course				
Teaching experience	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
1 – 5 yrs	21	34	12	10	77
6 – 10 yrs	23	27	2	4	56
11 – 15 yrs	19	49	9	9	86
Over 15 yrs	23	70	20	9	122
Total	86	180	43	32	341

Chi-square = 17,95 df = 9 p-value = 0,036

Since the p-value is less than 5% level of significance, then the perception of educators about support in the effective teaching of technology is significantly dependent on the type of settlement. It means that the majority (113/221 = 51%) of the educators in rural schools tend to strongly agree that educators need support in order to teach technology effectively, whereas the majority (58/119 = 49%) of the educators in urban schools tend to slightly agree. Figure 4 justifies this research finding. Excel software package was used to perform a chi-square test for the data in Table 6.

The chi-square statistic and the p-value with nine degrees of freedom were 17,95 and 0,036, respectively. Since the p-value is less than 5% level of significance, then the perception of educators about the above-mentioned statement is significantly dependent on the teaching experience. It means that 27% (i.e., 23/86) of the educators who tend to strongly disagree that the above-mentioned statement applies are educators with 6 - 10 years teaching experience, whereas 31% (i.e.,10/32) of the educators who tend to strongly agree are educators with less 6 years teaching experience. It

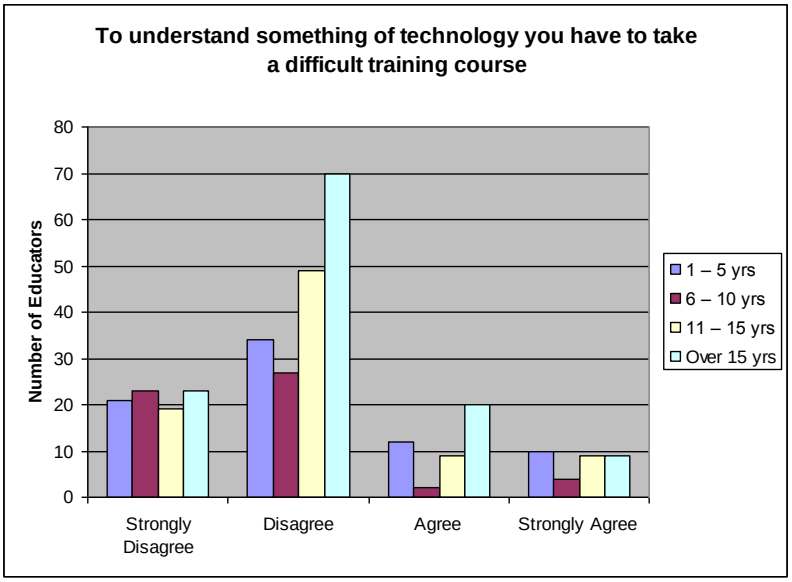

Figure 5: To understand something of technology you have to take a difficult training

implies that there is a significant difference of perceptions between more and less experienced educators about this concept. Figure 5 justifies this research finding

SUMMARY

Technology as a learning area has been only included in the curriculum less than ten years ago in South Africa. At the time of implementation, educators were not adequately trained and therefore incompetent. It is also a matter of concern to note that while Technology is a relatively new learning area, most educators felt that they are not supported sufficiently in schools. The gender variable cannot be overemphasized, as it is an important predictor of attitudes towards Technology-the same way it is in predicting attitudes towards Science. It is only when such educators show confidence that even female learners could be encouraged to follow such line of education and eventually conquer the world of work in Technology related occupations which was initially associated with males.

The study on educators' attitudes towards Technology indicates that generally most educators feel self-assured, and are comfortable with the learning area. They have interest in among others new discoveries, reading Technology related material and working with their hands. A point of concern running through the responses is a need for a constant support system as well as a thorough in-service training mechanism. Availability of resources, support and well-trained educators were seen as critical issues to be considered when implementing Technology. All interviewees reiterated the point that there should be a link between the department of education, industry and tertiary institutions. This was felt to be a workable approach for implementing Technology in the North West Province.

MAIN FINDINGS

- The perception of educators about the knowledge of technology is significantly dependant on gender, with males being more positive to the statement;
- The perception of educators about repairing things is significantly dependant on gender, with males being more positive to the statement;
- The perception of educators about technology training at university/college is significantly dependant on gender, with females being more positive to the statement;
- The perception of educators about support in the effective teaching of technology is significantly dependent on the type of settlement, with urban educators receiving more support; and
- There is a difference of perceptions between more and less experienced educators on the difficulty of technology.

RECOMMENDATIONS

The authors offer the following recommendations for further research:
The Department of Education should develop mechanisms for capacitating technology educators in order to develop their attitudes and concepts towards the implementation of technology education in schools by:

- Empowering female educators in particular to be more knowledgeable about technology and to be able to repair equipment;
- Introducing technology in the pre-service education at colleges and universities to build on permanent capacity to deliver technology to defined standards;
- Increasing the level of support provided to technology educators, especially those in rural areas; and
- Improving the perception of serving educators to see technology as being less difficult by providing relevant resources, support and accredited training.

In order to achieve the learning goal set out in the National Curriculum Statements, the Technology classroom should change to encourage teamwork, open ended design skill and improved educator attitudes towards technology. Teamwork inherently requires working together with a variety of people; it is reasonable to expect some level of conflict. It is more difficult though to predict when and where conflict will arise. Therefore in order to provide appropriate intervention and instruction it is useful to monitor team progress continuously throughout design teaching. This study presented an avenue for research that can provide valuable information concerning educator attitudes towards the implementation of technology education.

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