

Research Orientation and Research-Related Behaviour of Graduate Education Students

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ABSTRACT At the students' level, researchers' orientation tends to be undefined and hence students easily fall prey to having their orientation determined by factors other than those related to the nature of their research problems. The difficulties they experience especially in quantitative methods, biased supervisory advice, research orientations and motivational factors constitute some level of impediment to content learning, choice of research problem and to students' views of the importance of research skills for their future work. The tendency is for them to narrow their choice of problem to only that which will suit their non-crystallized orientation. This exploratory study tried to look at such interconnected web and to determine the influence of research orientation on some research-related affective and cognitive behaviour of UB graduate education students. To test the six research hypotheses posited to guide the study, data were collected from 78 UB graduate education students who registered for education research courses in 2006. These hypotheses were tested by carrying out z-test of independent proportion, chi-square analyses and one-way ANOVA statistical analyses. The results showed that a significantly higher proportion of the students prefer qualitative to quantitative research and gender has a significant influence on such preference. Research orientation was found to have significant influence on attitude towards research, research motivation, and perceived level of intellectual demand by research; but not on intention to enroll in a doctoral programme; willingness to be involved in research study; and their self-reported academic performance in research course. Problem with numbers was found to be a significant determinant of students' research orientation. These results were discussed and recommendations made.

1. INTRODUCTION

According to Trochim (2006), "there has probably been more energy expended on debating the differences between and relative advantages of qualitative and quantitative methods than almost any other methodological topic in social research" (p.1). "I've seen friends and colleagues degenerate into academic enemies faster than you can say 'last call' " (p.1). Miles and Huberman (1994) believe that these arguments are essentially unproductive (p. 41). The general consensus tends to be that these two approaches need each other more often than not. Generally the weaknesses of quantitative approach are the strengths of the qualitative approaches, and vice versa, thus an approach that encompasses the two approaches will provide researchers with a win-win situation.

To craft such a marriage successfully, there should be a strong understanding of the basic similarities and differences between them. Basically, any research is either out to satisfy a curiosity or interest or to contribute solution to one human problem or the other. That one approach involves words as input and the other

involves numbers is really not a great divide but the cyclic nature of the quantitative approach that inevitably involves both deductive and inductive logic; its scientific nature and hence the demand for generalizability and replicability imbues it with objectivity and systematized procedure. It is in these systemic demands that much of the expectations as regard definitions, assumptions and methodology and hence much of the differences between qualitative and quantitative research methods lay. Campbell's assertion (as cited in Miles and Huberman 1994) that "all research ultimately has a qualitative grounding" (p. 40), and Trochim's (2006) conviction that "all qualitative data can be coded quantitatively . . . (and) all quantitative data were based on qualitative judgment" (pp. 1, 3) argue strongly for such marriage, that is for a mixed method approach in educational research (Casebeer and Marja 1997). Colorado State University (2007) agrees with this line of argument. For her,

to a certain extent, researchers on all sides of the debate are correct: each approach has its drawbacks. Quantitative research often "forces" responses or people into categories that might not "fit" in order to make meaning. Qualitative

research, on the other hand, sometimes focuses too closely on individual results and fails to make connections to larger situations or possible causes of the results. Rather than discounting either approach for its drawbacks, though, researchers should find the most effective ways to incorporate elements of both to ensure that their studies are as accurate and thorough as possible (p. 3)

To many students, the choice of which research approach to use is a problem in itself, this is next to the choice of a problem which when analysed a research topic emanates. Most of the time such choice is done superficially at the research method level without a good grounding on the tenets and assumptions underlying the related paradigm. According to Schuize (2003), their decision to use quantitative rather than qualitative approach may be based exclusively on "natural inclination towards numbers" or on their love of "objectivity," and their preference for qualitative approach may be because the young researchers "enjoy being immersed in the research as a subjective partner and derive pleasure from the insights into human phenomena they gain this way" or on any single characteristic of that approach (p.11). They are also those students

for whom the choice of research method may be based simply on the fact that they were schooled in either quantitative or qualitative research approaches. The ignorance or expertise of the researcher's mentor, acting in the capacity of either supervisor . . . , may have been a primary influence that prompted the researcher to prefer one paradigm over the other (p.11).

1.1 The Problem and Purpose of the Study

The on-going war of wits between defenders of the positivist paradigm and the accompanying quantitative research approach and advocates of the constructivist, interpretivist and other paradigms and hence the qualitative approach to research tends to leave the young researcher trainees confused and disillusioned as to which approach to used in their research endeavour. The psychological strain resulting from such state of affair is suspected to have some adverse consequences on their affective reaction to and even their cognitive performance in the subject. According to Murtonen (2005a) "students' difficulties experienced in quantitative methods

courses, research orientations and motivational factors, do constitute an interconnected web that may also have implications for content learning and to students' views of the importance of research skills for their future work" (p. 1).

For students, the need to meet the research requirements for their degrees puts a lot of pressure on them to opt for one approach or the other. Even without a good grounding in or understanding of the philosophical underpinning of the qualitative and quantitative approaches to research, many graduate students have to make uninformed choice of which approach to use in their research project or thesis. Most of the time they are preyed upon by self-centered biased decision of or imposition from their supervisors. Such imposition oftentimes reflects the weaknesses of these supervisors resulting in a dangerous vicious circle. Hence oftentimes, because of the shortcomings of the supervisor, or of some personal factors or weaknesses which have nothing to with one's performance in research, students opt for one or the other of these research orientations. They allow considerations other than the nature and needs of the problem to which they are trying to contribute a solution to determine which research approach to follow. Based on factors like these, some come into their first research class with their minds already made up as regards their choice of orientation. This tends to narrow their motivation to learn materials related to other orientations.

Given these problems, the purpose of this study is to attempt a contribution to the disentanglement of such interconnected web and hence to determine the influence of research orientation on some research-related affective and cognitive behaviour of graduate education students in University of Botswana (UB).

1.2 Research Hypotheses

To provide a guide to this study, the following null hypotheses are posited to be tested. :

1. The proportion of UB graduate education students who are oriented towards qualitative research is not significantly different from that of those who oriented toward quantitative research.
2. Gender has no significant influence on research orientation among UB graduate education students.
3. UB graduate education students' self-reported academic performance in research

- is not significantly influenced by their research orientation.
4. Research orientation has no significant influence on attitude towards research by UB graduate education students
 5. Research orientation has no significant influence on UB graduate education students' research motivation
 6. Preference of research orientation by UB graduate education students is not significantly influenced by the level to which they have problems with arithmetic.
 7. Among UB graduate education students, research orientation has no significant influence on their perception of:
 - (a) the level of intellectual demand by research;
 - (b) their intention to enroll in doctorate programme;
 - (c) their willingness to undertake research study.

2. LITERATURE REVIEW

In a dissertation research study, Murtonen (2005a, 2005b, 2005c) carried out a series of five studies on university students' views, motivation, and difficulties on the learning of quantitative research methods and statistics were found to be more difficult for education and sociology students than other academic subjects. They reported difficulties in "linking theory with practice, unfamiliarity with and difficulty of concepts and content, constituting an integrated picture of the parts of scientific research in order to really understand it, and negative attitude toward these studies" (p.1). This was speculated to reflect students' earlier bad experiences with learning of mathematics and to be connected to students' content knowledge; and to their willingness to undertake quantitative research studies.

The fourth study found different views on research methods in Finland and USA with regard to students' appreciation of quantitative, qualitative, empirical and theoretical methods. Students were found to have different research orientations toward methods. This involved a combination of appreciations of, and readiness to use certain methods. "Some of the students had a dichotic attitude toward quantitative and qualitative methods; they seemed to choose their side between these methods." (p. 1). According to the report,

In both countries, a negative research

orientation toward quantitative methods was found which was associated with a positive view on qualitative methods. This qualitative research orientation was connected in some Finnish students with difficulties in learning of quantitative methods. When asked about difficulties experienced in learning of quantitative methods, 58% of the Finnish students and 21% of the US students reported such difficulties (p.2)

Study V found that in both countries, the students who had no concern as to their need of "research skills in their future work, were less task- and deep-oriented in their study situations, and experienced more problems with learning than the students who agreed that they would need research skills" (p. 2). Hence,

together, these five studies showed that students' difficulties experienced in quantitative methods courses, research orientations and motivational factors, do constitute an interconnected web that may also have implications for content learning and to students' views of the importance of research skills for their future work. (p. 2)

Another survey study on educational research by the same author (Murtonen, 2005a) was designed to determine whether a negative research orientation towards quantitative methods exists among graduate students from Finland and USA. Views from 196 Finnish and 122 American students were surveyed using a questionnaire, quantitative, qualitative, empirical, and theoretical methods, their readiness to use quantitative and qualitative methods in their own research, and the difficulties they experienced in quantitative methods' learning. Generally,

in both countries a negative research orientation towards quantitative methods was found. It was connected with either difficulties in quantitative methods' learning or with a lower appreciation of empirical methods than that of other students. Major subject and study year had no effect, so the views were not discipline-specific and students seemed to already have them on entering university. . . . A reduction in difficulties experienced with quantitative methods' learning was connected with a lowered over-appreciation of qualitative methods at the end of the course. (p. 1).

Meyer et al. (2005) explored the dimensionality of students' conceptions of research from two complementary research perspectives. Open-

ended written responses from 154 students to questions aimed at soliciting variations in conceptions of what research was when qualitatively analysed yielded eight main categories : (A) information gathering, (B) discovering the truth, (C) insightful exploration and discovery, (D) analytic and systematic enquiry, (E) incompleteness, (F) re-examining existing knowledge, (G) problem-based activity, and (H) a set of misconceptions. These were then used as item stems which were psychometrically operationalized into a Students' Conceptions of Research Inventory (SCoRI). This inventory was administered to a second heterogeneous sample of postgraduate students (n=224) and the resulting data were subjected to exploratory factor analyses. The results provided empirical support (as dimensions of variation) for a smaller subset of the categories isolated in the qualitative analysis. *"Empirically, and in terms of additional psychometric considerations, there was support for five dimensions of variation (common factors) in terms of categories B, C, F, G, and H. These findings provide an initial conceptual basis for interpreting how students engaged in research activity" (p. 1)*

2.1 Summary of Literature Review

Empirical studies on the influence of research orientation on students' research-related behaviours are lacking. The few reviewed tend to agree that quantitative methods and statistics are more difficult for education and sociology students than other academic subjects. This was speculated to reflect students' earlier bad experiences with learning of mathematics and to be connected to students' content knowledge; and to their willingness to undertake quantitative research studies. Students were found to have different research orientations toward methods. Students who had no concern as to their need of research skills in their future work, were less task- and deep-oriented in their study situations, and experienced more problems with learning than the students who agreed that they would need research skills

Students' difficulties experienced in quantitative methods courses, research orientations and motivational factors, were found to constitute an interconnected web that may also have implications for content learning and to students' views of the importance of research skills for their

future work (Murtonen 2005a). The negative research orientation towards quantitative methods was found to be connected with either difficulties in quantitative methods' learning or with a lower appreciation of empirical methods than that of other students. A reduction in difficulties experienced with quantitative methods' learning was connected with a lowered over-appreciation of qualitative methods at the end of the course.

3. RESEARCH METHOD

This is an exploratory study carried out to determine the relationship that exists between the research orientation and some cognitive and affective research-related behaviour of graduate education students at UB. Data for this study were collected from UB graduate education students who took first of the two required courses in educational research for graduate students in the faculty of education in 2006. Of the 83 students who registered for the course 78 willingly took part in the study. Some were absent from class on the date the data were collected. Of this number, 52 were females while 25 were males, one did not indicate his/her gender.

The questionnaire for the study was developed by first listing several indicants (Kerlinger and Lee 2000) of each of the variables involved in the study and then converting these into questionnaire statements intended to elicit the level of behaviour under measurement possessed by the participant. The subjects were requested to react to each of the statements by choosing the level to which they agreed or disagreed with it. The agreement scale had seven options ranging from 'very strongly disagree' to 'very strongly agree'. A Cronbach alpha analysis of the reliability of the instrument in measuring the variables gave: attitude towards research (12 items), $\alpha = .907$; research motivation (12 items), $\alpha = .816$; perceived level of anxiety provoked by research (6 items), $\alpha = .743$; perceived level of intellectual demand by research (2 items; split half), $r = .550$, giving a reliability index of .71.

4. RESULTS

Of the 78 subjects for the study 31, 17, and 30 preferred qualitative, quantitative and mixed-model research orientations respectively. A z-test of independent proportion was done to test the

first hypothesis of significant difference in the proportion of UB graduate education students who are oriented towards qualitative and quantitative. This gave a z-value of 2.43 which given a critical z-value of 1.96 ($\alpha = .05$) led to the rejection of the null hypothesis. That is to say, among UB graduate education students, significantly higher proportion of students are oriented towards qualitative than quantitative research.

The second hypothesis was tested by performing a chi-square (χ^2) test of the dependence of research orientation on gender of the respondents (Table 1). This gave a chi-square (χ^2) value of 10.879 which, given a critical value of 5.991 ($df = 2, \alpha = .05$), was found to be significant. Hence the orientation of UB graduate education students

depends significantly on gender. A close look at the table entries shows that the source of the significance is the frequency distribution for the quantitative research orientation. While about 12 female students were expected, given the null hypothesis, to opt for quantitative research orientation, only 6 did so, whereas while 5 males were expected to opt for this orientation, 11 actually did. So we can say that preference for quantitative research orientation is biased towards males. Such a pattern is not visible given the other orientations.

The third hypothesis was tested by carry out a one-way ANOVA of the self-reported grades of the students as influenced by level of research orientation (Table 2). A grade of A was coded 1; B, 2; C, 3; and D, 4. The analysis gave an F-value of 1.205 which was observed to be less than the critical F-value of 3.15 ($df = 2, 70; \alpha = .05$). This led to the non-rejection of the null hypothesis of no significant influence of research orientation on cognitive performance in research.

The fourth hypothesis which speculated a significant influence of research orientation on attitude towards research was tested by carry out a one-way analysis (Table 3). This gave an F-value of 5.763 which given a critical value of 3.15 ($df = 2, 70; \alpha = .05$) leads to the rejection of the

Table 1: Chi-square (χ^2) analysis of the dependence of research orientation on gender

Research orientation	Gender of respondents		Total
	Female	Male	
Qualitative research	23(21.1 ^a)	8(9.9)	31
Quantitative research	6(11.6)	11(5.4)	17
Mixed research	24(20.4)	6(9.6)	30
Total	53	25	78

^aExpected frequencies are in parentheses; $\chi^2 (2, N = 78) = 10.879, p = .004$

Table 2: One-way ANOVA of the influence of research orientation on UB graduate education students' self-reported course performance

Research orientation	n	Mean	Std. Deviation	Std. Error
Qualitative research	26	2.42	0.86	0.17
Quantitative research	16	1.94	1.24	0.31
Mixed research	29	2.14	1.03	0.19
Total	71	2.20	1.02	0.12

Research orientation	Sum of squares	df	Mean square	F	Sig.
Between groups	2.51	2	1.25	1.205	.306
Within groups	70.73	68	1.04		
Total	73.24	70			

Table 3: One-way ANOVA of the influence of research orientation on UB graduate education students' attitude towards research

Research orientation	n	Mean	Std. Deviation	Std. Error
Qualitative research	31	53.06	18.13	3.26
Quantitative Research	17	69.47	12.86	3.12
Mixed research	25	61.76	16.16	3.23
Total	73	59.86	17.43	2.04

Source of variation	Sum of squares	df	Mean square	F-Value	p<
Between groups	3091.96	2	1545.98	5.76	.005
Within groups	18776.67	70	268.24		
Total	21868.63	72			

Table 4: One-way ANOVA of the influence of research orientation on UB graduate education students' perceived level research motivation

<i>Research orientation</i>	<i>n</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error</i>	
Qualitative research	28	67.86	12.05	2.28	
Quantitative research	17	75.53	8.78	2.13	
Mixed research	28	73.96	7.02	1.33	
Total	73	71.99	10.06	1.18	
<i>Source of variation</i>	<i>Sum of squares</i>	<i>df</i>	<i>Means square</i>	<i>F-value</i>	<i>p<</i>
Between groups	800.36	2	400.18	4.32	.017
Within groups	6486.62	70	92.67		
Total	7286.99	72			

Table 5: Chi-square (χ^2) analysis of the dependence of research orientation on perceived level of problem with arithmetic

<i>Research orientation</i>	<i>Perceived level of problem with arithmetic</i>			<i>Total</i>
	<i>Low</i>	<i>Average</i>	<i>High</i>	
Qualitative research	8 (10.7 ^a)	7 (8.7)	16 (11.5)	31
Quantitative research	10 (5.9)	3 (4.8)	4 (7.3)	17
Mixed research	9 (10.4)	12 (8.5)	9 (11.2)	30
Total	28	22	28	78

null hypothesis. Hence among UB graduate education students, research orientation has significant influence on their attitude towards research. Given the significant F-value, a post-hoc analysis using least significance difference (LSD) test was done. This showed that it was only those who are oriented towards quantitative research that showed significantly ($p = .001$) favourable attitude towards research than those who prefer qualitative research.

Another one-way ANOVA was done to test the Hypothesis (a) on the influence of research orientation on the perceived level of research motivation, (Table 4). This gave an F-value of 4.349 which given a critical value of 3.15 ($df = 2, 70; \alpha = .05$) led to the rejection of the null hypothesis. In other words, for UB graduate education students, research orientation has a significant influence on their perceived level research motivation. The observed significant F called for a post hoc multiple comparison of the group means to determine which pairs were significantly different. An LSD test showed that students who are oriented towards qualitative research has significantly less research motivation than those oriented toward mix ($p = .020$) and quantitative research ($p = .012$).

A chi-square (χ^2) analysis was done to determine whether problem with arithmetic significantly influences the research orientation of UB graduate education students. The analysis gave a χ^2 value of 9.851 which was found to

indicate significant influence when compared to the critical χ^2 value of 9.488 ($df = 4; \alpha = .05$) (Table 5). In other words, the level to which students perceived that they have problems with numbers has a significant influence on their preference of research orientation. A close look at the table shows that students who perceive high level of problem with arithmetic tend to prefer qualitative research, while those who perceived low level of problem with arithmetic tend to opt for quantitative research.

A similar one-way analysis of variance was done to test Hypothesis 5 (b) which in the null form speculated no significant research orientation influence on students' perception of level of intellectual demand by research. The result (Table 6) gave an F-value of 3.757 which was found to be higher than the critical F-value of 3.15 ($df = 2, 77; \alpha = .05$) led to the rejection of the null hypothesis. In other words, the research orientation of UB graduate education students significantly influences their perception of level of intellectual demand by research. A post hoc least significance difference analysis showed that students with quantitative research orientation perceived research as intellectually demanding significantly more than those with qualitative ($p = .022$) and mixed model ($p = .039$) orientations

To test the null hypothesis of no significant research orientation influence on the level of intention to enroll in the doctoral programme, a one-way ANOVA was also done (Table 7). This

gave an F-value of 2.249 which was observed to be lower than the critical F-value of 3.15 ($df = 2, 76; \alpha = .05$), hence the null hypothesis was retained. To test the last null hypothesis of no significant research orientation influence on the level of willingness to undertake research, a one-way ANOVA was also done. (Table 8). This gave an F-value of 1.56 which was observed to be lower than the critical F-value of 3.15 ($df = 2, 71; \alpha = .05$), hence the null hypothesis was not rejected. Therefore for UB graduate education students research orientation has no significant influence on their willingness to undertake research.

Graduate education students at UB are significantly more likely to be oriented towards

qualitative than quantitative approach to research, and gender has a significant influence on such orientation. Students who opted for quantitative research approach showed an insignificantly higher cognitive performance in research; significantly more favourable attitude towards research and along with those who opted for mixed model approach showed significantly higher research motivation than those who opted for qualitative research approach. Students with qualitative and mixed model orientations perceived research as being significantly less intellectually demanding than those who are orientated towards quantitative research. The level to which subjects perceived they have

Table 6: One-way ANOVA of the influence of research orientation on UB graduate education students' perceived level of intellectual demand by research

<i>Research orientation</i>	<i>n</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error</i>	
Qualitative research	31	10.90	2.27	0.41	
Quantitative research	17	12.59	1.33	0.32	
Mixed research	30	10.70	2.91	0.53	
Total	78	11.192	2.48	0.28	
<i>Source of variation</i>	<i>Sum of squares</i>	<i>df</i>	<i>Means square</i>	<i>F-value</i>	<i>Sig.</i>
Between groups	42.99	2	21.49	3.76	.028
Within groups	429.13	75	5.72		
Total	472.12	77			

Table 7: One-way ANOVA of the influence of research orientation on UB graduate education students' level of intention to enroll in doctorate programme

<i>Research orientation</i>	<i>n</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error</i>	
Qualitative research	31	1.48	0.508	0.09	
Quantitative research	16	1.75	0.447	0.11	
Mixed research	30	1.70	0.466	0.09	
Total	77	1.62	0.48772	0.06	
<i>Research orientation</i>	<i>Sum of squares</i>	<i>df</i>	<i>Means square</i>	<i>F-value</i>	<i>Sig</i>
Between groups	1.04	2	0.52	2.25	.113
Within groups	17.04	74	0.23		
Total	18.08	76			

Table 8 : One-way ANOVA of the Influence of research orientation on UB graduate education students' level of willingness to undertake research study.

<i>Research orientation</i>	<i>n</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Std. Error</i>	
Qualitative research	30	4.17	1.76	0.32	
Quantitative research	15	5.00	1.00	0.26	
Mixed research	29	4.28	1.53	0.28	
Total	74	4.38	1.56	0.18	
<i>Sources of variation</i>	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Between groups	7.45	2	3.72	1.56	.218
Within groups	169.96	71	2.39		
Total	177.41	73			

problem with numbers was found to have a significant influence on preference of research orientation. Research orientation has no significant influence on students' level of intention to enroll in advanced degree, or on level of willingness to undertake research studies.

5. DISCUSSIONS

The interpretations and discussions of the findings of this study are guarded by the fact that this is an exploratory study with some limitations. The most important of these is that all subjects in this study took the same research course taught by one instructor in education. Hence teacher's influence cannot be ruled out. These in a way limit generalization especially in the face of lack of relevant empirical literature in the area of the influence of research orientation to which findings of this study could be compared for convergence and consensus.

Compared to 42% of Finnish and 79% of American samples (Murtonen 2005a), only 22% of UB graduate education students opted for quantitative research orientation. That such orientation is significantly influenced by students' problem with numbers tends to imply that UB graduate education students are generally weak in mathematics. The significance of the influence of gender on research orientation and the significantly larger proportion (68%) of female among graduate education students of 2006/2007 intake class is a plausible explanation for the overall significant preference of qualitative over quantitative approach to research by UB graduate education students. Similar observation was made by Murtonen (2005a) of 58% of Finnish student sample who because they "experienced difficulties in learning quantitative methods" were likely to opt for qualitative methods. But according to ESRC (n.d.), "there is a general underestimation of the complex skills that high quality qualitative research involves. There is need to combat the assumption that it is an easy alternative for those who 'can't do stats' " (Slide # 2). Students generally tend to ignore philosophical grounding, which they rarely have, of the research approaches when determining their preference of a research approach but readily fall back on perceived natural inclinations, perceived level of difficulty of the unpreferred approach and supervisors' decision (Schulze 2003). The difficulties they experience especially

in quantitative methods (Eberle 2005; Eberle and Bergman 2005), biased supervisory advice, uncrystallized research orientations, motivational factors and even peer pressure constitute some level of impediment even to content learning, to choice of research problem and to students' views of the importance of research skills for their future work (Murtonen et al. 2007). In the choice of research problem the needs of the problem are often not considered, that is, the analysis of the problem under study to determine the approach that will best provide valid solution to the problem under study is rarely done. This study agrees with Olson (n.d.) that the focus on method should not drive research rather, the ontological and epistemological stances of researchers vis-à-vis the needs of the problem under consideration.

Contrary to Murtonen's (2005a) "interconnected web that may have implications for content learning" there is some comfort in that for UB graduate education students, whatever research approach the students opt for does not influence significantly their cognitive performance in their research course. This would allow students the liberty to choose any approach without the fear of not performing cognitively well in research. But the finding that students with qualitative and mixed model orientations perceived research as being significantly less intellectually demanding than those who are orientated towards quantitative research does not quite fit into this line of thinking. In support of Murtonen's finding, a significant dependence of preference for qualitative approach on level of problems with numbers faced previously by the students was found. While numerical logic which is inevitable in quantitative research tends to deter students from getting involved with such research, the analysis involved is no more done by hand but through computer packages specially designed to ease the work of the researcher.

The higher enthusiasm for research portrayed by their significantly superior research motivation may underlie the more favourable attitude shown by students that preferred quantitative to qualitative research approach. This again tends to be out of line with Murtonen's (2005a) "interconnected web that may have implications for content learning" Superior favourable affective behaviour always tends to be associated with superior cognitive performance, but this was not significantly the cause here.

The fact that research orientation has

significant influence on some research-related affective behaviour and even some too, though insignificant, on research-related cognitive behaviour has implications for students' preference of research approaches. Such preference should be informed and should depend on the interest of the students. Faculty of education should strengthen research endeavour in all its forms and expose students equally to the tenets and assumptions of the different paradigms underlying all research approaches and then they should be allowed to choose the approach that would best lead to a valid solution of the problem under study. The trend against quantitative among UB graduate education students may be checked by the introduction of a basic required course in numerical reasoning.

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