©1997 IFIP. Published by Chapman & Hall

11

The centrality of affective variables in the implementation of a national strategy for teacher and pupil information technology suitability in elementary schools

Yaacov J. Katz
School of Education
Bar-Ilan University, Ramat-Gan 52900, Israel

Abstract

Empirical studies dealing with the relationship between personality and attitudinal variables on the one hand and computer related variables on the other have consistently indicated that not all teachers or pupils relate in the same positive way to the use of Information Technology (IT) in the educational situation. It appears that certain personality traits and attitudinal sets characterising teachers and pupils are related to positive computer related attitudes whereas other personality variables or attitudinal constructs are connected to less positive computer related attitudes.

A national strategy of introducing computers into the educational system should take personality and attitudinal variables of both teachers and pupils into consideration in order to achieve as efficient and as cost-effective a utilisation of computers in the classroom as possible. It is also postulated that different personality and attitudinal constructs will be related to differential attitudes towards the various hardware and software packages available for instruction and learning.

Keywords

Attitudes, instruction (CAI), pedagogy

1 INTRODUCTION

Modern society is becoming increasingly more dependent on information technology in general and on computers in particular in order to solve its daily problems. The educational system is becoming aware of the importance of computers in the teaching and learning domains and there is cautious optimism that the growing use of computers in schools may well bring about the long dreamed of educational revolution for teachers and pupils alike. The modern day educational system is

attempting to rise to the challenges posed by computers, and it appears that computers have the potential to contribute to improved teacher skills and performance. Robinson (1989), in summing up almost twenty years of experience regarding the use of computers in the educational system, declared that it is now commonly accepted that computers should play a central role in education.

Other commentators, however, recognise that the educational impact of computers within the classroom has not as yet been efficiently maximised. The computer has not as yet become the potent force in the educational system as confirmed by Dunn and Ridgway (1991). These researchers put the lack of efficiency in computer use in the educational system down to the fact that not all teachers and pupils have the personality and attitudinal profiles necessary for the effective use of computers in the instructional and learning processes.

2 TEACHERS

One of the three main areas in which the computer can bring about positive change within the educational system is that of instruction (the other two being administration and auxiliary specialisations). Thus teachers are in the forefront of the technological revolution that is overtaking the educational system and have the potential to increase efficiency within the teaching process by effectively utilising the computer for Computer Assisted Instruction (CAI) which can include the use of drill and practice, the use of generic software for pupil-computer interaction, the use of databases and spreadsheets, as well as the use of individualised software programs for the benefit of heterogeneous learning groups. Schools are under increasing pressure to respond to the rapid changes occurring in modern society and as a result teachers will have to play an increasingly central role in utilising computers for the benefit of their pupils.

It appears that there is a significant correlation between teacher personality and the acceptance of computers as an effective instructional aid. Chandra, Bliss and Cox (1988) indicated that the attitudinal and personality sets of teachers seem to be important factors in their decisions to use (or disregard) computers in CAI, thus emphasising the centrality of teacher personality to positive computer oriented attitudes.

Offir and Katz (1990) indicated that teachers characterised by the ability to accept innovation and change are more willing to use computers as an instructional aid within the framework of CAI than teachers who prefer traditional teaching methods. In addition they confirmed that teachers who, by their very nature, are risk-takers in their personal and professional lives are more likely to have positive computer oriented attitudes than teachers who are cautious and fear taking risks. In a study which examined the personality attributes significantly correlated with positive computer oriented attitudes on the basis of the Eysenck Personality Questionnaire (Eysenck and Eysenck, 1975), Katz and Offir (1991) found that positive extraversion which includes loudness, boisterousness, and sociability; inverse neuroticism which includes calmness, flexibility, social adjustment and self-confidence; and positive psychoticism which includes impulsiveness, craving of change, as well as stimulus- and sensation-seeking are significantly related to positive attitudes of teachers towards the use of computers for instruction in the classroom situation.

Although Katz and Offir (1991) conducted their study using the Eysenckian personality model in Israel, a series of personality studies (Levin and Montag, 1987) have indicated a high level of similarity between the personality constructs and attitudes held by Israeli subjects, and those held by Western European, North American and Asian samples. Therefore it may be inferred that the personality attributes related to computer oriented attitudes in the sample of Israeli teachers could conceivably be correlated with computer linked orientations among teachers in other societies.

Evans, Katz and Francis (1995) indicated that, contrary to popular belief, there are no significant gender differences regarding positively oriented computer related attitudes among teachers. These results confirm earlier studies conducted by Hunt and Bohlin (1993) and Kay (1989) which intimated that no differences exist between male and female teacher trainees regarding computer attitudes. Evans, Katz and Francis (1995) further showed that teachers, familiar with computers as a result of home use or because they voluntarily attended computer courses, had a lower level of computer anxiety and more positive attitudes towards computers as instructional tools than teachers lacking basic computer experience.

There is no doubt that the chain of findings presented in this paper indicate that personality traits and attitudinal constructs are primary factors to be taken into consideration when deciding the suitability of the individual teacher to computer use in the instructional process, despite the almost universal familiarity with computers that has developed in modern society.

3 PUPILS

Katz and Offir (1993) stated that the computer has the potential of increasing the effectiveness of the learning process, is able to supply both individualised and controlled instruction, is capable of gathering and storing a wealth of information, can rapidly execute complex learning tasks, and can easily present pupils with accurate evaluations and other educational outputs. Although many schools have acquired computers and use them in the instructional process, it is not yet clear whether a majority of pupils are in fact able to efficiently use computers for Computer Assisted Learning (CAL). One of the issues apparently related to positive computer attitudes as well as efficient computer use in the classroom, is that pertaining to pupils' personality profiles (Kulik, Bangert-Drowns and Williams, 1983). An examination of studies conducted to ascertain personality and attitudinal traits of pupils engaged in CAL indicates that certain personality and attitudinal variables are significantly correlated with pupils' computer related attitudes. Empirical evidence intimates that certain personality and attitudinal traits are related to more positive computer related attitudes than others.

It appears that positive attitudes toward CAL are related to higher levels of self-recognition, self-confidence and locus of control of elementary school pupils (Woodrow, 1991). Katz and Offir (1990) found that positive computer oriented attitudes are related to social image and school satisfaction. Pupils with a positive social image prefer study through the medium of CAL as do pupils who express dissatisfaction with teachers who use traditional and older established teaching methods.

Katz (1993) indicated that pupils characterised by creativity and originality have more positive CAL related attitudes than those not typified by the same factors. In addition, personality traits, such as impulsiveness, stimulus-seeking, sensation-seeking, creativity, and the craving of change, significantly characterise pupils who have positive computer related attitudes. On the other hand, pupils typified by anxiety, depression, tension, irrationality, shyness, moodiness, dependency, emotionality, guilt feelings, low self-esteem, and need of social acceptance, hold less positive computer related attitudes.

Regarding the issue of gender, Harvey and Wilson (1985) and Martin, Heller and Mahmoud (1992) indicated that no sex differences were found between male and female elementary school pupils regarding their computer related attitudes. These findings contradict popular opinion that boys hold more positive computer related attitudes than girls.

The above mentioned studies dealing with computer related attitudes clearly indicate the existence of a significant relationship between pupils' personality and attitudes and the will to use computers in the educational setting. It appears that certain personality and attitudinal constructs promote the adoption of positive computer related attitudes whereas other personality and attitudinal variables mitigate against the formation of positive attitudes toward the use of computers in the educational setting.

4 CONCLUSION

The growing body of evidence presented above indicates that personality and attitudinal variables are related to positive computer related attitudes of teachers. It is suggested that a screening process, based on personality and attitude examination is adopted by school authorities or school principals in the decision-making process regarding the employment of teachers who, in their instructional roles, are expected to use computers. It is advised that teachers' basic personality and attitudinal attributes are examined so as to evaluate their suitability to effective computer usage. The computer may well bring about the long dreamed about educational revolution, and more specifically, the teaching revolution. If the teachers using computers for CAI possess the personality attributes which promote positive computer oriented attitudes, then the chances of achieving the dream of an educational revolution through the use of information technology may finally be realised.

A similar screening strategy based on examination of personality and attitudinal constructs is recommended for implementation regarding the selection of pupils suited to computer assisted learning tasks. It appears that learning self-image, and social self-image, in addition to other attitudinal variables such as school satisfaction, and motivation for study have a bearing on the formation of pupils' attitudes towards the use of computers in the learning process. It is becoming increasingly apparent that, for psychological reasons, not all pupils have positive attitudes towards learning with computers. Thus it is tentatively suggested that some type of elementary psychological screening and adaptation take place before pupils are introduced to CAL so that all pupils may be initiated into differential computer learning that suits their own particular personalities or attitudinal profiles. A national screening strategy,

such as that suggested above, may conceivably contribute to added effectiveness of outcomes when using computers in the learning process.

5 REFERENCES

Chandra, P., Bliss, J. and Cox, M. (1988) Introducing computers into a school - management issue. *Computers and Education*, **12**, 1, 57-61.

Dunn, S. and Ridgway, J. (1991) Computer use during primary school teaching practice: a survey. *Journal of Computer Assisted Learning*, **7**, 7-17.

Evans, T.E., Katz, Y.J. and Francis, L.J. (1995) Psychometric properties of the Hebrew version of the Francis Attitude Towards Computers Scale. *Psychological Reports*, **77**, 1003-1010.

Eysenck, H.J. and Eysenck, S.B.G. (1975) *Manual of the Eysenck Personality Questionnaire*. Hodder and Stoughton, London.

Harvey, T.J. and Wilson, B. (1985) Gender differences in attitudes towards microcomputers shown by primary and secondary school pupils. *British Journal of Educational Technology*, **3**, 183-187.

Hunt, N.P. and Bohlin, R.M. (1993) Teacher education students' attitudes toward using computers. *Journal of Research on Computing in Education*, **25**, 487-497.

Katz, Y.J. (1993) Achievement level, affective attributes and computer oriented attitudes: a profile of a successful end-user, in A. Knierzinger and M. Moser (eds.) *Informatics and changes in learning*. IST Press, 13-15 (Section VII), Linz, Austria.

Katz, Y.J. and Offir, B. (1990) Computer assisted instruction and students' social orientations. *Proceedings of 5th Jerusalem Conference on Information Technology*. IEEE Computer Society Press, 660-664, Los Alamitos, CA.

Katz, Y.J. and Offir, B. (1991) The relationship between personality and computer related attitudes of Israeli teachers. *Education and Computing*, **7**, 249-252.

Katz, Y.J. and Offir, B. (1993) Computer assisted learning and cognitive abilities: hardware and software implications, in A. Knierzinger and M. Moser (eds.) *Informatics and changes in learning*. IST Press, 11-13 (Section I), Linz, Austria.

Kay, R.H. (1989) Gender differences in computer attitudes, literacy, locus of control and commitment. *Journal of Research on Computing in Education*, **21**, 307-316.

Kulik, J.A., Bangert-Drowns, R.L. and Williams, G.W. (1983) Effects of computer-based teaching on secondary school students. *Journal of Educational Psychology*, **75**, 19-26.

Levin, J. and Montag, I. (1987) The effect of testing instructions for handling social desirability on the Eysenck Personality Questionnaire. *Personality and Individual Differences*, **8**, 163-167.

Martin, C.D., Heller, R.S. and Mahmoud, E. (1992) American and Soviet children's attitudes toward computers. *Journal of Educational Computing Research*, **8**, 155-186.

Offir, B. and Katz, Y.J. (1990) Computer oriented attitudes as a function of risk-taking among Israeli elementary school teachers. *Journal of Computer Assisted Learning*, **6**, 1-2, 168-173.

Robinson, B. (1989) Computer assisted learning: automatons or thinking individuals, in W. Tulasiewicz and A. Adams (eds.) *Teachers' expectations and teaching reality*. Routledge, 232-246, London.

Woodrow, J.E.J. (1991) Locus of control and computer attitudes as determinants of the computer literacy of student teachers. *Computers and Education*, **16**, 237-245.

6 BIOGRAPHY

Dr. Yaacov J Katz serves as the Deputy-Director of the School of Education and Head of Educational Sciences at the Bar-Ilan University. He also serves as the Chairman of the School of Education's Graduate Studies Program and is the Director of the Institute of Community Education and Research. His main teaching and research interests focus on attitudinal research in the school system with particular emphasis on computer related attitudes of teachers, pupils and students. Dr. Katz has edited a book on the impact of pedagogical and psychological variables on computers in education and has published numerous scholarly articles in internationally recognised academic journals.