Training Cops' Decisions in Deadly Force through Reflection by Use of a Powerful Learning Environment

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Abstract

The program *FireProf* is a demonstration of a computer based environment with the aim to support the thinking activities that foster flexible knowledge use of students instead of supporting reproduction of knowledge. It is an example of case-based instruction, situated learning in the workplace forcing cognitive collaborative knowledge negotiation, conceptual change and development. The paper aims to contribute to the discussion of how computer based programs can be used in education in another way as an electronic book or a game of putting the right answers forward to the posed questions.

The study concerns the training of 20 aspirant officers in justifying their judgemental shooting decisions in deadly force situations. Eight Officers interacted with an additional hypermedia learning environment FireProf. No difference between experimental and control group could be determined concerning the progress in technical and judgemental shooting, and teachers judgements about students' approach (verbal, moving, tactic and decision). However the arguments put forward by the experimental group in justifying their decisions in deadly force situations increased in contrast to the control group.

Keywords — Hypermedia, constructivism, powerful learning environment, advanced problem solving, vocational training.

1. Introduction

Complex and rapid changes in society requires personal development, flexible knowledge, higher-order skills, social commitment and permanent professional education. This requires from learners an active knowledge construction instead of a solitaire information processing. Therefore education should not encourage learners to behave like Xerox copiers that mainly reproduce external knowledge. On the contrary, at any given point, education has to recognize that the learner has a store of knowledge about scientific topics that are his/her constructions of reality based upon his/her experiences or interactions with the real world (8). At any given moment this knowledge base has to be the starting point for future learning (14). Prior knowledge can enable the learner to relate concepts, to think of examples, to structure the learning material, etc. (12). In this way, adequate activation of prior knowledge (factual and strategic knowledge) can support knowledge (re)construction processes aimed at deeper understanding. By using prior knowledge learners can search for and construct meaning and structure (5) in order to act in complex problem situations.

At this point, we would like to stress that we do not consider the (re)construction of knowledge to be a goal in itself: we would like to plead for less rigid knowledge acquisition and maximizing the transfer of learned knowledge to real life situations. The ultimate goal of education should not only be students' graduation but the flexible appliance of '(school) knowledge' when *(a)* acquiring new knowledge and insight and *(b)* solving less familiar or advanced problems. Also when they finish school and learn and work in the community. Recent developments in cognitive educational psychology, instructional design and computer technology indicates promising theories and principles to meet these goals and requirements.

Constructivist notions (7, 3, 11) emphasize the subjectivistic character of knowledge construction as a result of students' individual knowledge and strategic experiences and their interpretations of the world around them. Also is emphasised that the acquisition of rigid factual knowledge is of less use when one never learns

and practices how to use knowledge and strategies in complex intransparent situations. The latest are important to come to more understanding or to become able to solve more complex and unfamiliar problems. This has implications for the concepts and practice of learning and 'instruction' (6).

If a more structural understanding is required (e.g. creating a web of links between 'exact' knowledge, other domains, personal (pre)conceptions and personal interpretations of the world) instead of a functional understanding (e.g. able to answer questions; (2) then learning as a process of knowledge construction instead of a receptive or assimilative kind of learning but (10) is more adequate. It is the experience of the relativity of the heard, read or transmitted 'objective' knowledge, of construction of knowledge, of theory change that leads to students cognitive flexibility, which is needed to transfer formal knowledge in solving real-life, or new, advanced problems. Questions or problems for which mostly there is not just a single answer or solution. A reality where no single best way of thinking or knowledge exists, where the ability to question and evaluate the assumptions underlying various interpretations of the world in connection with the self-constructed knowledge is needed.

Educating for a less transparent reality addresses the instructional goal of forcing students awareness that multiple perspectives may be brought to bear on a problem (9); that coming to understand another's view requires dialogue, not simple absorption of what the other says or mere acquisition of new facts; that learning can and often should occur in social setting and negotiating (3). For designers and teachers it means a shift from the idea that learning should be situated in decontextualized and simplified contexts, towards the idea of learning in situations reflecting the complexity of reality.

Bringing an integrated form of hypertext/media and interactive multimedia in an instructional setting is often believed to stimulate students' active searching for and construction of meaning and structure by using foreknowledge and analogies. According to cognitive flexibility approach (11, 9) these kinds of integrated environments encourage the construction of knowledge if several conditions are met. They have to offer multiple representations forms (text, audio, visual, schematic etc.), multiple relations with foreknowledge by bridging, authentic and complex problems and 'random access' as well as stimulation of generative learning activities are incorporated.

But is it possible to assemble these theoretical notions into the learning practice of the workplace and does learning automatically takes place if these conditions are met? Many studies, however, show that only few students use their prior knowledge spontaneously and actively (1). Moreover, many students show the tendency to study for reproduction rather than for knowledge construction because they are not prepared and/or able to engage in cognitive and metacognitive activities aimed at constructing or restructuring knowledge (4).

Apparently, for many students instructional strategies and learning aids implemented in a powerful learning environment are needed to support that learners apply learning and thinking activities to accomplish knowledge (re)construction processes. Such instructional strategies and learning aids could be characterised as 'process-oriented': their aim is to ensure that students employ appropriate thinking activities in order to construct, change and use their conceptions of the learning content (13).

This study is an attempt to incorporate some of the above stated principles into a powerful learning environment. The subject of this environment is the training of police officers in taking and justifying split-second decisions in deadly force situations. The anticipation of policemen on possible deadly force situations was supported by stimulating their reflective thinking and argumentation. Therefore a case-based hypermedia learning environment (FireProf -PC-Windows-) was developed in which multiple representations forms (text, audio, visual, schematic etc.), multiple relations with foreknowledge, authentic and complex problems and 'random access' as well as stimulation of generative learning activities are incorporated. What is the impact of such an environment on the technical and judgement shooting skilfullness and the competence of justifying decisions and actions in deadly force situations.

2. Method

20 aspirant officers, students of the police academy, participated in the study. Students learning progress on life fire shooting, simulation shooting, approach and argumentation of their decision in simulated deadly force situations where registrated. The study followed a pre-treatment-posttest design. The treatment consisted of a regular four weeks shooting module. As pre- and posttest served the teachers judgement of students' behaviour (talking, pronunciation, moving, deciding, shooting) in a realistic simulated deadly force situation; students life fire shooting results, argumentation's of decisions in a deadly force situation, presented within a computer based measurement tool (decision and argumentation measurement, BAM). During the course use of the facilities in FireProf were on-line recorded.

During this module 8 of the students (experimental group)used FireProf, the hypermedia cases exploration program, and elaborated tree of the fifteen cases each. Besides the above mentioned data also on-line registration took place of frequency and time students used the different facilities in the FireProf program. The experimental students also followed, just as the other participants, the regular practical and theoretical lessons.

3. Material

Point of departure are the Dutch cases in the Fire Arms Training System (FATS: an interactive fire arm training simulation) and anticipation through reflective thinking on the split-second decisions in deadly force situations. The latest is done by stimulating generating learning activities like for instance requiring argument(s) of officers' decision, and by forcing negotiation of experience by require that students leave an advice or comment on the negotiation platform.

FireProf is a case exploration program offering multiple representation forms. Students have to take a decision and to act in an advanced realistic problem situation. The realistic, authentic, deadly force situation is presented on the monitor screen in a full motion software based video mode. By using the mouse a student is able to pull his gun and decide to shoot or not to shoot at a certain moment. The movie stops at that moment. After this action the student can counsel 7 different experts like for instance a judge, public prosecutor, colleague, a shooting teacher. They comment the students action related to his shot/decision moment. This is the way that the principle of 'cognitive landscape criss-crossing' is realized. Beside counselling this audio database the student can `criss-cross the landscape' by exploring the presented case by going back and forward picture by picture or to replay or play the digital video presented case forward. Each time a critical situation is passed other comments of the experts are available. The student can also counsel an indexed database of relevant subjects and law articles and an open database of 'cop rules' and cops' experiences. The latest is a realisation of the collaborative negotiation of knowledge platform. Because the students are unfamiliar with such kind of platform, they are forced to leave an advice or question for colleagues or teachers and other experts on the open database before leaving the program. There advice or questions have to be related to officers' approach in similar cases as presented. This action means that students build their own public knowledge base. Before ending the program the student is also forced to type in at least one argument why he decided to shoot or not to shoot. He also has to classify his argument as being a strategic, a law based or a social/emotional based argument

4. Results

4.1. Life fire shooting

A MANOVA was carried out on the life fire shooting data (accuracy fire and fire in self-defence). Although the experimental group showed a tendency of more skilfullness after two weeks of training this differences was not statistical significant. Both groups progressed in there skilfullness but no significant difference in life fire shooting could be determined.

4.2. Simulation shooting

The experimental group tended to hit more moving targets and showed better basic judgemental shooting results then the control group. However a MANOVA could not determine significant differences between the experimental and the control group on the pre- and posttest.

4.3. Teacher judgements

ANOVA's on the pre- and posttest data of teacher judgements of students' actions in video based, simulated deadly force situations could not reveal significant differences between the experimental and control group concerning students' verbal approach, moving, tactical approach and decision.

4.4. Argumentation and justification

Because of the small number of participants and the amount of argumentation categories no statistical analysis were carried out on these data. However the mean amount of arguments students used to justify their actions increased from 4,7 to 7.2 in the experimental group in contrast to a decrease in the control group from 5,3 to 4,7. The mean diversity of arguments decreased in the experimental group from 2,6 to 2,1 and increased in the control group from 1,9 to 2,2 different categories

The argument categories which the experimental group mostly put forward on the pretest concerned: `personal threat', `not shooting because of a hostage' and `alternative approach: calling'. On the posttest it concerned the categories: `personal threat', `self-defence (juridical argument)' , `subjective competence that it will be a hit' and `reconsidering the decision'. The argument categories which the control group mostly put forward on the pretest concerned: `personal threat', `not shooting because of a hostage' and `subjective competence that it will be a hit'. On the posttest it concerned the categories: `alternative approach: take cover', `reacting on what happens before' and `firearm suspected person'.

4.5. Use of facilities

Students mostly listened to the comments of the judge, the public prosecutor and the colleague with experience in a shooting incident. They also frequently made use of exploring the video based case by going forward or backwards. Students spent most of their time on formulating their arguments and reading, reacting on, or leaving a message on the negotiation platform

5. Conclusion and Discussion

The additional learning environment FireProf aims to stimulated students' reflections on and thinking through of split second decisions in the advanced problem situations of deadly threat situations. This had no effect on students' technical shooting skill, judgements

of situations and approach of these situations. So, thinking through does certainly not has the effect that it inhibits people to react adequately. However it has an impact on the competence of students in using more arguments when justifying their approach and decisions.

Because of some hardware conflicts the experimental subjects could not use the FireProf-environment so intensive as was planned. Therefore the results has to be seen as a pilot study. The outcomes of an other study in which 70 police officers participated has to gain a better insight into the effectiveness and impact of a program like FireProf and also on the implementation problems of such a program in a working organisation.

The program FireProf is a demonstration of the possibility of a computer based environment design with the aim to support the thinking activities that foster flexible knowledge use of students instead of supporting reproduction of knowledge. It is an example of case-based instruction, situated learning in the workplace forcing cognitive collaborative knowledge negotiation, conceptual change and development. The results shows that multimedia computer environments can be function in an other way as an electronic book or a game of putting the right answers forward to the posed questions. Educational improvement is not served by designing a copy of a drilling, information sending teacher embedded in an attractive multimedia environment. The results shows that hyper or multimedia computer environments can improve education by functioning as a cognitive tool for the students to construct their own knowledge base in order to use knowledge instead of a drilling machine supporting copying and building a rigid knowledge base.

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