

The use of multimedia tools for improving movement notion and increasing the efficiency of motor learning in skiing

Ivan Ruzicka^{1a}, and Jana Milova¹

¹University of Hradec Kralove, Faculty of Education, Department of Physical Education and Sport, Hradec Králové, 500 03, Czech Republic

Abstract. The aim of this paper is focused on the problem of improving movement notion and increasing the efficiency of motor learning in skiing using multimedia tools. The text approaches the system providing a targeted feedback in the process of the acquisition of skiing skills. The platform influencing the movement notion introduces innovative means of the acquisition of essential skiing skills in ski courses organized by the Department of PE and Sport of the Faculty of Education, University of Hradec Králové. The paper presents the selected results of the survey realized by an enquiring method, which was aimed to find out opinions on a monitored platform among students specializing in physical education and sport, who took part in this form of education. The research results indicate that the use of multimedia tools in providing visual feedback can effectively influence the process and the final effect of the acquisition of skiing skills. Positive opinions of the overwhelming majority of respondents illustrate that the use of video analysis in combination with verbal mistake correction is an effective support in skiing practice and it is an efficient platform that accelerates results in learning skiing technique, especially in the context of educational courses. Conclusions also point to some of the negative aspects related to the use of multimedia tools within the platform.

Keywords: Multimedia tools; acquisition of skiing skills; movement notion; video analysis; feedback

1 Introduction

Since the turn of the millennium a close attention has been paid to the issue of introduction of modern technologies in the field of education. Many authors engaged in using ICT promotes their use also in the process of motor learning [11, 3, 4]. It was repeatedly verified that use of modern technologies can help the teaching focus more on

^a Corresponding author: ivan.ruzicka@uhk.cz

individual students needs and leads them to the active learning through independent exploration and problem solving with higher efficiency in achieving the results [10, 1]. Use of modern technologies in physical education (PE) has a positive impact on education, similar to other subjects [9], increases students' motivation, makes learning more entertaining and enables individual approach [8, 7]. Acquiring motor skills presupposes good movement notion and systematic learning process planning. Feedback is used most often in skiing didactics to increase the efficiency of motor skills acquisition process. A frequently used means of feedback-learning is video. Video analysis has been monitored and studied as a significant educational means that can increase motor learning efficiency [2, 6, 5] Video analysis of movement helps forming and fixing movement notion in the process of acquiring motor skills and improving movement technique.

A helpful tool in motor learning is a good quality demonstration straight in the educational process (immediate reflexion) and/or video recording as a visual feedback (presentation and analysis after practice has been finished) with an extension to a subsequent training in practice. The aim of using structured group and individual video feedback in the process of forming movement notion is to increase efficiency and reach a positive impact on learning speed and also on the final level of acquired skills during a short-run ski course programme.

2 Method

2.1 Research design

The survey was carried out by an enquiring method, which is aimed to find out opinions on a platform of providing video feedback in the process of motor learning, particularly learning basic skiing skills, among the students of University of Hradec Kralove (CZE). The methodological approach of the empirical research is based on quantitative analysis. Data were analysed using statistical and logical techniques for description, illustration, discussion, and evaluation. Research was conducted in two phases: Phase 1- in the winter seasons of 2013 to 2015 there were nine cross-country and downhill ski courses, where students participated in practical training, field video recording and subsequent evening group video analysis of individual skiing elements; phase 2- in March 2015 poll sheets were distributed among the students, and the obtained data were processed.

To achieve the research goals the following research questions were posed:

1. How do the respondents evaluate influence of video feedback on the subsequent process of acquiring or improving skiing technique?
2. How do the respondents evaluate improvement of movement notion in the selected skiing elements using video feedback of other skiers within a group video feedback?
3. How do the respondents appreciate the overall benefits of video feedback in the process of motor learning?
4. What will be the impact of participation in the first video analysis on self-confidence of the respondents?

2.2 Participants

The one hundred thirty-one students specializing in PE and sport - 108 students of a bachelor study programme (B. A.) and 23 students of a master study programme (M. A.) at the Faculty of Education, University of Hradec Kralove – in total there was 36 % of girls

and 64 % of boys, 80 % of students specializing in teaching of PE and sport and 20 % of students of leisure education specializing in PE and sport.

3 Results

An input part of the research was monitoring of respondents' previous experience with video feedback in motor learning. Data showed that a tight majority of the respondents did not have any personal experience with an instructor-facilitated video feedback in motor learning. In 51.1 % of the respondents there were 37.4 % with no experience, 9.9 % had experience only with ski courses of University of Hradec Kralove (UHK) and 3.8 % of the respondents had experience only with self-video feedback (no instructor).

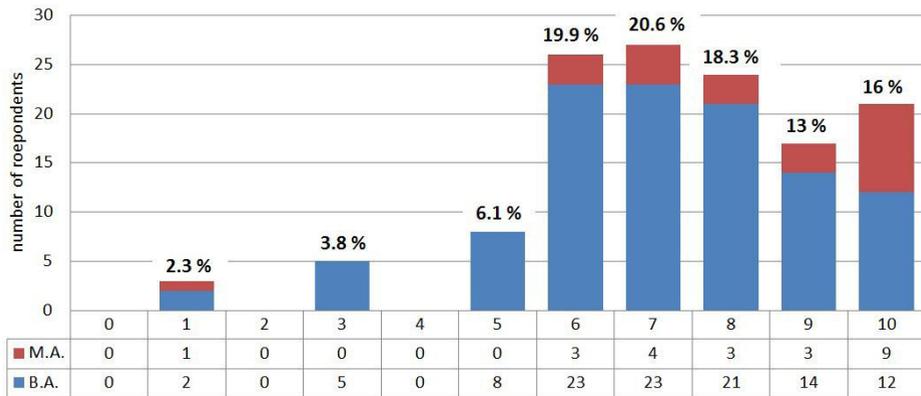


Fig. 1. Evaluation of the effect of video feedback on the process of acquiring or improving skiing technique Legend: 0 = "no benefit", 10 – "maximum benefit"

In the evaluation of personal influence of video feedback on the subsequent process of acquiring or improving skiing technique a scale of 0 – 10 was used. Most respondents (58.8 %, out of which 43.5 % were of M. A. and 62 % were of B. A.) marked the value of 6 – 8, which indicated above-average level of influence. As the most frequent evaluation among M. A. students there was the value of 10 (39 %) while among B. A. students there was the value of 7 (20.6 %). As the lowest rating there was the value of 1, selected only by 3 respondents (2.3 %). 5 respondents of B. A. (3.8 %) selected the value of 3, which indicated below-average level of influence. The value of 0 (no influence) was not selected by any respondent. The average value of all the respondents was 7.6, which indicated significantly above-average level of influence.

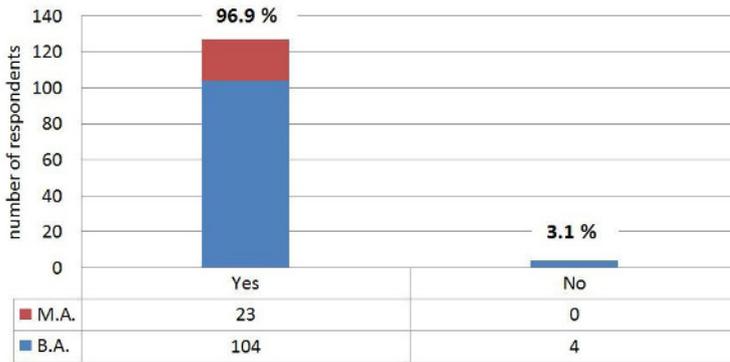


Fig. 2. Evaluation of improving the movement notation of the selected skiing elements using a group video feedback Legend: 0 - “no benefit“, 10 - “maximum benefit“

In the evaluation of improving movement notion of the selected skiing elements using group video feedback a scale of 0 – 10 was used. The most frequent value was 7, selected by 36 respondents (27.5 %). Maximum level of influence of video feedback on the movement notion improvement (value of 10) was identified by 9.2 % of the respondents. On the other hand 2.3 % of the respondents selected the value of 0. In total 89 respondents (68 %) are convinced that the video feedback of other people (group feedback) has a positive influence on improving the movement notion (rating 6-10). Zero or very slight influence (rating 0-2) was marked by 8.4 % of the respondents. The average indicated value of all the respondents was 6.7.

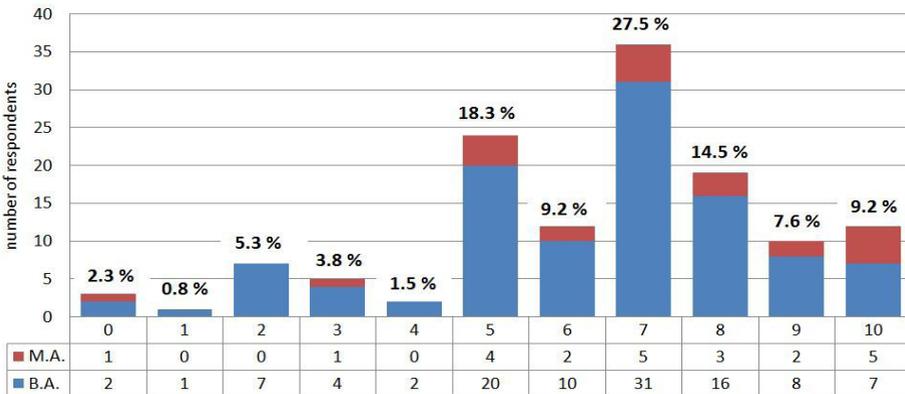


Fig. 3. Evaluation of the ability to identify the fundamental mistakes in the technique of one’s own movement or the skills of other skiers after watching a video feedback

The overwhelming majority of all the respondents (96.9 %) are convinced that watching group video feedback can improve the ability to identify fundamental mistakes in skiing technique – 96.3 % of the respondents of B. A. and full 100 % of M. A. Only 4 respondents assumed that this platform is not useful in the field of learning skiing.

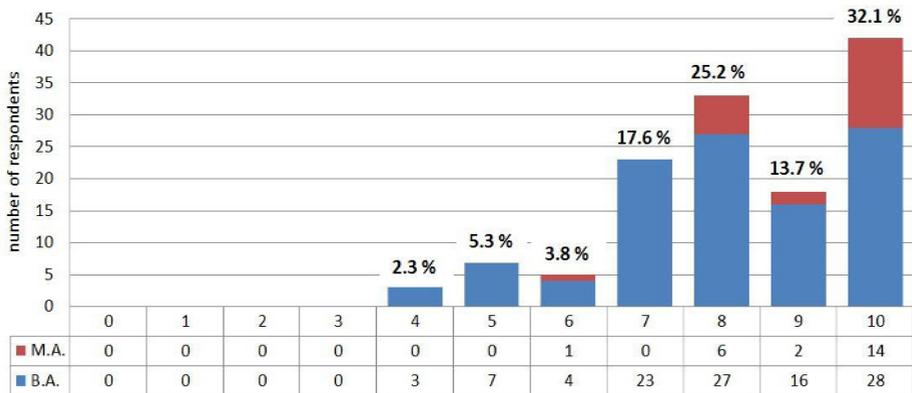


Fig. 4. Evaluation of the general benefit of reinforcing the movement notion using a video feedback
 Legend: 0 - “no benefit“, 10 - “maximum benefit“

When evaluating the general benefit of reinforcing the movement notion using a video feedback the most frequently marked value was the highest rating of 10 (maximum benefit) – in 61 % of M. A. and 26 % of B. A., in total 32.1 % of all the respondents. It was followed by the rating of 8 (in 26 % of M. A. and 25 % of B. A.) Grades 0-3 (no or very low benefit) were not marked. Average and slightly below-average values of benefit (rating 4-5) were selected by 7.6 % of the respondents (9.3 % of the respondents of B. A., while neither of M. A.). 121 respondents consider the video feedback above-average beneficial (91 % of B. A. and all the respondents of M. A., that comprise 92.4 % in total). The average value indicated on a scale 0-10 was 8.3 (8.1 in B. A., 9.2 in M. A.).

The respondents also evaluated (see Fig. 5) the impact of their first video feedback on self-confidence on a scale from -5 (demotivated – a left part of the graph) through 0 (no impact) to +5 (maximum motivated – a right part of the graph). More than half of the respondents (52 %) marked a negative and stronger negative impact on their self-confidence. Nearly 10 % of the respondents assumed that participating in the first video feedback did not affect their self-confidence. The average value marked by the respondents concerning negative evaluation is 2.4. Only about a third of the respondents (38 %) had a positive impression when watching the video feedback for the first time.

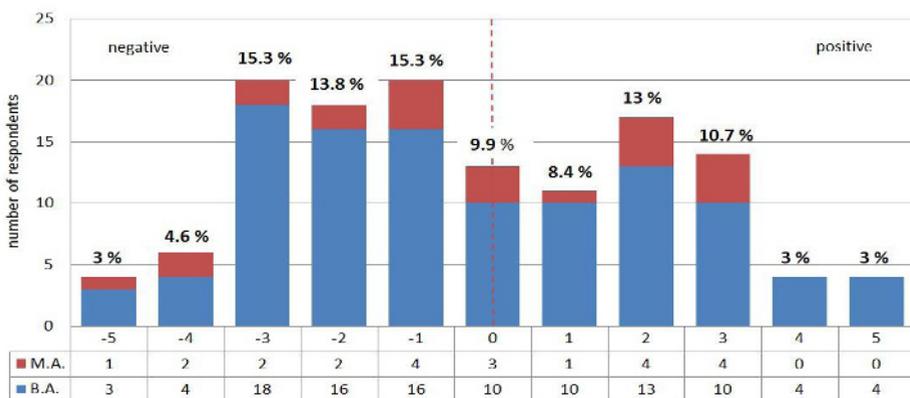


Fig. 5. Evaluation of the impact of the first video feedback on self-confidence
 Legend: -5 – “demotivated“, 0 – “no impact“, +5 – “maximum motivated“

4 Discussion

The results showed that the given platform is used more often in youth training than in PE at school: 48.9 % of the respondents had some previous experience with video analysis in motor learning, out of which 34 % gained it in a sports club. Only 15 % of respondents had some experience from school PE: 10 % from secondary school and 5 % from elementary school. These results suggest low use of the video feedback in educational practice. Studies acknowledge that use of multimedia in PE increases students' motivation. It makes learning more entertaining and enables an individualized approach [3, 8]. However, the authors of this study assume that there exist reasons for seldom use of motion video analysis in elementary and secondary school teaching: higher demands on organization of teaching, time demands in PE lessons, respectively fears of potential technical problems, specific demands concerning technical skills etc. The situation could be improved by forming a convenient platform of education – as a part of university studies of PE teachers or in pedagogical lifelong education.

The evaluation of the effect of video feedback on the process of acquiring or improving skiing techniques (see Fig. 1) shows that a vast majority of the respondents acknowledge video feedback as a valuable tool. 87.8 % of the respondents agree that video feedback can strongly affect acquiring and improving of movement technique. In fact only 6 out of 100 respondents do not regard the influence of video feedback too beneficial. This supports the view of Tearl & Golderb [11] that the use of video analysis feedback enables individuals and groups to identify areas for further technique development and helps them acquire and improve the given skiing skills.

In total 68 % of the respondents are convinced (rating 6-10) that watching the video feedback of other people (group feedback) has a positive effect on improving movement notion (see Fig. 2). Only 8.4% of respondents marked no or very little benefit (rating 0-2). This positive result of evaluation of group feedback impact supports the view of Tearl & Golderb [11] that comparing student performance with other demonstrations (especially successful or verbally corrected) allows students a more realistic self-assessment as a basis for further improvement of motor skills. According to Schmidt & Wrisberg [7] there is a significant impact of video use on motivation in motor learning. The authors of this study suggest following a potential positive impact of a group video feedback on personal motivation not only in relation to acquire higher quality of motion technique, but also to support a social status within a study group.

Results of the evaluation of the ability to identify the fundamental mistakes in the technique of one's own movement or the skills of others skiers after watching video feedback (see Fig. 3) shows that an overwhelming majority of respondents (96.9 %) are convinced that watching group video feedback improved their ability to identify the fundamental mistakes in skiing technique. The research studies of Schmidt & Wrisberg [7] and Watson & Radwan [12] were consistent to show that a mere video playback is not always helpful for learning (the record itself without commentaries offers too much information and the student may not be able to choose a right feedback). To support the findings of the above-mentioned authors, the authors of this study used an effective method called "cueing" (searching for key points when the teacher focuses verbally just on key points of the movement) in the platform of providing video analysis, which is much more efficient.

In the field of evaluation of the general benefit of reinforcing the movement notion using video feedback there was a significant positive response of the respondents (see Fig. 4). In total 92.4 % of the respondents consider video feedback above-average beneficial (rating 6-10). The results confirm the positive findings of Raiola, Giugno & Napolitano [5], where 80% of participants improved their motor notion and subsequently the movement

technique, leading to a higher performance, using video motion analysis combined with verbal analysis.

Concerning the impact of the first video feedback on self-confidence, more than half of the respondents (52%) marked negative to stronger negative impact (see Fig. 5). The results suggest that although the platform of providing video feedback brings considerable positives, the first experience with video analysis of one's movement can also cause complications for the subsequent process of acquiring motor skills. Some tension may occur for example as a result of divergence of perceiving one's own movement and its real performance based on video analysis. In fact, there is a certain moment of surprise to loss of motivation for further development (resignation, decrease in aspiration, fear of failure), which may be a barrier to achieving a higher level of a motor skill acquisition. The whole teaching process can be slowed down or even stopped. From the point of view of a teacher the authors of the study recommend to use higher verbal sensitivity before and during the first video analysis to prevent from affecting the participants' self-confidence. Teacher should also verbally encourage to further improvement of motion technique, regardless of the initial state and feelings.

5 Conclusions

The results of this survey generally support the opinion of Ronchetti [6] that an appropriate application of video in learning can make the teaching process more efficient. The research results suggest that the use of multimedia tools in providing visual feedback can effectively influence the process and the final effect of the acquisition of skiing skills. Positive opinions of the respondents show that the use of video analysis in combination with verbal mistake correction is a useful support in skiing practice and it is an efficient platform that accelerates results in learning skiing technique, especially in the context of ski course learning. Results also point to some of the negative aspects that may be related to the use of multimedia tools within the platform. Specifically, one of them showed a negative effect of the first experience with video analysis on the self-confidence of participants. Use of video analysis opens up not only direct opportunities for improving movement notion and increasing the efficiency of motor learning in skiing, which can increase students' motivation, based on their successful development, but also opportunities for improving the quality of teaching process and forming more effective teaching strategies.

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