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Experiences of using a video-based learning model during a long-term process of movement awareness and learning – a hermeneutical study

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**ABSTRACT**

**Aim:** To explore the long-term learning process in movement awareness development supported by a video-based learning model. **Participants:** Eleven undergraduate nursing students. **Method:** The students participated in learning sessions comprising video modelling, video feedback and reflective enquiry with a focus on inter-personal interaction. Each student participated in three individual video sessions during a four-month period. Three individual interviews were carried out, the last one 12–18 months after the final session. Visual, verbal and written material were collected from the video sessions, individual interviews and diaries, and interpreted within a hermeneutical approach. **Results:** The learning process was described in three themes: motivation for change, exploring alternative perspectives and movement changes through challenges. **Conclusions:** The video-based learning model implies a challenging experience on a personal level that supports motivation and a deep approach to learning. It adds a powerful base for reflection, which encourages student-centred active learning. The facilitator’s reflective approach is essential to allow the student to explore her/his own movement, in contrast to delivering instructions. The learning model may be valuable in the physiotherapist’s clinical work in facilitating patients’ movement awareness in the process of movement improvements.

**Abbreviation:** Interview person (IP)

**Keywords:** Ergonomics ; feedback ; hermeneutics ; learning ; movement ; video recording

**Introduction**

A core feature of the professional role of physiotherapists is to support the development of gentle and effective movements, for rehabilitation and preventive purposes [1]. How the body is used could be crucial in demanding work situations in order to prevent and control musculoskeletal symptoms [2]. Awareness of one’s own movements is an important aspect in learning gentle movements [3].

Observational practice, feedback, model demonstrations and motivation have been proposed to be important for the learning and performance of specific motor skills [4]. Self-controlled feedback, where the learner is actively engaged in how and when feedback is to be given is preferable for supporting motor skills learning [5–7]. Similar results were found by Huang et al. [8], who in addition highlighted the importance of adaptive feedback. New feedback possibilities now exist due to the availability of different user-friendly technical devices. The benefits of using video
to provide feedback have been proposed in different practical learning situations, such as supporting physiotherapy students in their practical skills development [9] and as support for physical performance within an exercise programme among older adults [10]. A learning situation watching oneself on video may provoke feelings of discomfort and displeasure for the learner in the initial phase at the same time as it is experienced as being useful [11]. However, little is known about experiences of using video feedback as a means for enhancing personal movement learning and development in a long-term perspective.

Previous interventions with a focus on movement learning within the field of load-related ergonomics in patient transfer situations have not shown sufficiently beneficial results in preventing musculoskeletal symptoms [12]. The description of the educational methods in these studies is often lacking and the core feature of the activities is that they have been carried out with group sessions. Educational aspects of how to support long-lasting individual movement learning within this field has, to our knowledge, not been focused on in the literature.

A facilitator-led, video-based learning model including video feedback in combination with reflective enquiry, diary notes, video recordings for home practice and video modelling has been developed [13] and was used in this study. Previous studies have shown that the model supports the visualisation of movements and the development of movement awareness and self-analysis among nursing students [ibid.] and the potency in the experience of encountering one’s own movement [11]. However, experiences of using the video-based learning model as a means to support movement awareness and learning in a long-term perspective are not explored previously.

The aim of this study was therefore to explore the long-term learning process in movement awareness development supported by a video-based learning model.

Method

A qualitative, interpretative design with a hermeneutic approach was chosen to develop a deeper understanding of the students’ learning processes [14].

Participants

All undergraduate nursing students at the end of the second and third years of study (105 students) were invited to participate. Twenty-one students volunteered to participate, five of whom withdrew prior to the beginning of the study [13]. Five students only participated in the first session and eleven completed the whole intervention (ten women and one man), mean age 24.6 years (range 21–39), except for one student who did not participate in the second session and first interview due to a clinical placement abroad. They gave written informed consent prior to the first session. At the beginning of the study, the participants responded to a questionnaire regarding their musculoskeletal symptoms and impact on daily life activities [15]. All participants reported musculoskeletal symptoms interfering with their daily activities, during the past three and twelve months.

Intervention

The intervention in this study was the use of a video-based learning model comprising video feedback in combination with reflective enquiry, diary notes, video recordings for home practice and video modelling and is further described elsewhere [13]. The model is based on a number of theoretical perspectives. One is observational learning that suggests that a system for building internal models of the task and the body movement, by watching others, is a core feature of the movement learning process [16]. Another important assumption for the learning model is that there is likely to be an optimum way of moving that is gentle for the body and requires the least energy. This thinking is based on the dynamic systems approach that describes the complexity of multisegmental movements [17,18].

The intervention comprised three individual sessions at the university (Figure 1), with a longer interval between the second and third session to allow time for practice and reflection during a clinical placement period. In each session, the participating students performed lifting and weight transferring activities that were recorded on video. An experienced and trained physiotherapist asked open and reflective questions related to what the students did and what was seen in their video recordings. The intention was to facilitate the students’ reflection on their movement in their own words while watching the video recordings of one self. The students were thus enabled to perform and watch

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their movements several times [13]. Three movements were performed each session, selected as being ordinary, basic and easy to instruct; starting to walk from a sitting position, climbing up and down a low step and lifting a box from a chair to a table. The students’ own video recordings were compared and video modelling was used to provide the students with an example of the movement to compare with at the end of the training session. Each student selected video recordings to keep for home practice and were invited to write diary notes during these four months.

**Sources of information**

The video recordings of the movement performances during the three individual sessions were also used in the analysis together with transcribed audio recordings obtained from the sessions to capture the students’ learning processes. Semi-structured individual interviews with the students at three occasions were conducted by the first author and were transcribed verbatim. The interviews lasted from 20 to 52 min. An interview guide was used with open-ended questions with the aim of capturing the students’ thoughts and feelings about using the learning model. The students’ diary notes were collected after the last interview and were included in the analysis to add information regarding the students’ reflective process in their daily life (Figure 1).

**Interpretation process**

The hermeneutic interpretation of the different sources of information was inspired by the thinking of Gadamer [14], who stated that understanding is only possible through our pre-understanding. He maintained that we have to allow a fusion of horizons between the researchers’ pre-understandings and the text’s history in order to attain a deep understanding of a phenomenon. As far as possible, it is thus important to be aware of and clarify the researchers’ pre-understanding. The mix of backgrounds in the research group (two physiotherapists and two nurses) facilitated a creative reflective process and a number of possible interpretations were discussed and challenged while attempting to remain open-minded towards the data [19]. This was especially important as the research group has been involved in previous studies comprising the development of the learning model. None of the authors was involved as examiners of the students in their ordinary education.

To gain an understanding of the students’ process of learning and development, the varying sources of information (video recordings from the sessions, interview transcripts from the interviews and diary notes) were reviewed and interpreted in chronological order. Each student’s process was studied and preliminary interpretations were formulated by the first author. Comparisons were then made with a focus on differences and similarities between the students’ learning processes. Our different pre-understandings were used in a creative and iterative process made in discussions within the research group in which new interpretations were formulated and compared with the previous ones. During the process, the interpretations were continuously compared with the raw material. Interpretations of the video material were made of the visible changes seen in the recordings based on the basic concept of observational movement analysis [20] in which movement initiation, direction and flow were important aspects. Throughout the process, there was a continuous shift in attention between the whole (the learning process in its entirety) and the parts (details in for example changes in the movements). As in the metaphor of the hermeneutical spiral [21] developed from Gadamer’s [14] description of the hermeneutical circle, the interpretations were continuously developed and the understanding gradually expanded.

**Results**

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The hermeneutic interpretation of the process of developing movement awareness and change led to the development of three themes and seven sub-themes (Table 1).

Table 1. Overview of the three themes and seven sub-themes.

<table>
<thead>
<tr>
<th>Motivation for change</th>
<th>Exploring alternative perspectives</th>
<th>Movement changes through challenges</th>
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<td>Supporting internal motivation</td>
<td>Having the opportunity to try different alternatives</td>
<td>Being hindered by aspects and attitudes in everyday life</td>
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**Motivation for change**

The students appeared to engage in their learning and find motivation in their learning processes. It also seemed to encourage a changing and reflective process in their daily life.

*Initiating change by discovery*

Being guided in observing one’s own movements in the recordings engaged and challenged the students at a personal level and seemed to stimulate curiosity and a new awareness. The forceful experience seemed to stimulate initiation of a continuing changing process. This seemed to bring about a conscious change of movements, but also in a seemingly unconscious way. Some students were astonished and expressed pleasure when comparing the actual change seen in the recordings, as they felt it did not correspond to the small amount of practice done.

It’s fun to see that changes have taken place in how one works in how one walks and moves and lifts things despite not thinking about it all the time but some sort of subconscious change has taken place as I’ve seen how I do it and what I’m doing wrong. (Ip 6, interview no. 2)

Most students chose to keep the recordings they considered as their worst and best, as well as the role model recordings. Having the opportunity to see their own recordings at home was experienced as important despite not all the students utilising the opportunity. Some students expressed that the recordings were already ‘in their heads’ after the first session and they did not feel a need to see them at home.

*Supporting internal motivation*

Seeing and experiencing changes and development in the ease of one’s movements, instantly and over time, supported the students’ internal motivation. The students expressed a new awareness and found motivation in understanding how their movements could influence the occurrence of future bodily symptoms. They gained reassurance of their development by comparing recordings.

It what also good that you can see the improvement when you see the file. you can see the change in a different way I think/…/then you’re a bit more motivated, that it shows how you…you may not feel the same yourself but you get a little incentive that it shows that it’s become better. (Ip 8, interview no. 3)

Some students found motivation outside of themselves and for example were in great need of external reminders, and they experienced difficulties finding meaning or applications for use in everyday movements. While some students expressed an intrinsic desire to change and they found applications for the knowledge in everyday life and expressed a greater usefulness for the diary. Those, who found the diary beneficial, saw it as a reminder to reflect and as more important at the beginning of the process than at the end.

*Exploring alternative perspectives*
The different ways of support into a reflective process and the ability to try different alternatives in performing a movement was important for the students. This was furthermore important for the development of an understanding of the relationship between the details in the movements and the movement in its whole.

**Reflection for movement development**

The students were encouraged to become active in their learning process. Articulating and reflecting about one’s movements seemed to support the development from simply observing the movements, to being able to reflect, analyse and adapt movements. Being able to express one’s own movements in one’s own words and getting confirmation in the reflective process, was interpreted as increasing the students’ confidence in their ability to analyse and describe their own movements during the sessions and in daily life.

Was going to lift a heavy bag into the boot of the car. I bent my knees but my legs were close together and thus didn’t get any strength from my legs and my arms and back, struggled to get the bag in. Next time I’ll bend my knees and stand with my legs wider apart so that I can use strength from my legs and the weight shift to get the bag into the car. (Ip 11, diary note)

The students, reflecting about both the details and the movements in their entirety, also associated to everyday situations. In the video recordings it was also noted that those demonstrating a verbal understanding also adapted their movement performance during the session. They also described how they observed and analysed others’ movements and discussed ergonomic issues with others based on their new knowledge.

The students found the facilitator’s approach important and supportive for movement development. The conversations between the facilitator and the students were characterised by reciprocity. The facilitator was responsive and adaptive to the student’s individual learning and reflection, and the students experienced equality. The facilitator tried to be adaptive in accordance with the student’s response.

Even if she was to help me to develop how I move so it still felt as …. she was equal and that she could just as well have made the mistakes and wasn’t judgmental in any way. (Ip 1, interview no. 1)

The balance of facilitator and student activity during the sessions varied. The facilitator became a more active agent when a student was quieter. Some students appreciated this and found it supportive for their development while some became confused and the process of change became more complicated. This was interpreted as it being more difficult for the facilitator to individually tailor support when the students did not verbalise their thoughts.

**Having the opportunity to try different alternatives**

Confidence among the students was strengthened by repeating and adjusting the movements. The students had the opportunity to experience how the movement felt when they tried different ways. When the movement felt comfortable and easy to perform, the students felt rewarded and confirmed, both by seeing themselves in the recordings and by the feeling in their bodies.

And you got to repeat it at your own pace. and you got to repeat and you got to see it and you got. because if you see it you can see what you are doing wrong/…/so you know both how you do it and what it looks like/…/so that you can do it right and better. (Ip 4, interview no. 3)

The facilitator encouraged the students through reflective enquiries to shift focus between details and the movement in its whole. This was perceived as supportive for the development of different perspectives. It seemed to be important to look at details to create opportunities for an understanding of the movements in their entirety. This could, however, cause confusion leading to constrained and unnatural movements at first. A small change such as change in pressure in the initial phase of the movement, had a great impact on the movement as a whole. These changes were also visible in the recordings.

It’s not particularly big changes you have to do with your feet for the movement to be much better so that’s what I’ve started to think about a lot more/…/it’s become much clearer here, as I’ve said, when I can see it. (Ip 6, interview no. 2)

The students with the main attention on details of the movements, without linking them to the whole, needed more time and practice to achieve flow in the changed movements. They also needed more verbal and/or practical hands-on guidance by the facilitator to shift focus in the analysis.
Movement changes through challenges

The students experienced a long-term reflective process and increased movement awareness, which supported them to begin to change their movements in daily life. This process differed among the students and they were hindered by different aspects of ordinary life.

Time to integrate the movement change

The students experienced an increased awareness and change of their movements in everyday life. This process differed among the students, some needed more time than others. Some students used the increased awareness to change various movements in everyday situations. For most students, the major changes occurred between the first and second session. It was then visible in the video recordings that the students had, to a greater extent, adapted and integrated the changes in their movement patterns in the third session. The need for active practice of the movements was described as decreasing as the movements were integrated in daily life.

Being hindered by aspects and attitudes in everyday life

The students experienced that stress, together with the lack of adequate and available assistive devices, hindered the application of gentle work techniques. Working together with colleagues, who were less conscious of their work techniques and unwilling to change, was described as inhibitive and aggravating. Feeling insecure in their work technique in, for example, patient transfer situations made it more difficult for the students to dare to try to change the situation, even if they could clearly recognise the need for a change. The students expressed that previous habits and ideas about ‘good’ alignment or movements, impeded the process of change in everyday life.

Yes but I actually feel that it should be done this way and that it’s easier. but then it’s the case that if you’ve been told since you were a child to just sit up straight, sit up straight. and it’s a habit that. takes a little time. but you think about it. (Ip 4, interview no. 1)

Discussion

The students’ long-term learning processes in movement awareness development appeared to be supported by the video-based learning model. The students developed self-reflection and awareness of their own movements and motivation for change through different challenges and by exploring alternative perspectives. This process could be understood as a long-term process from doing and observing to reflecting and adapting. The students appeared to develop abilities for analysing movements, encouraged by the facilitator. The alteration between details and the whole seemed to facilitate the learning even though it required time. It also required time for the movements to become embodied in daily life practice, a process that differed between the students. Students who focussed mostly on details without linking them to the whole, needed more time, practice and hands-on guidance than those who were quickly able to see the connection between details and the whole. The facilitator’s approach seemed to play an essential role in promoting the learner to become active and reflective in his/her learning process, and to overcome the initial feelings of discomfort. Having the learner’s perspective in mind all the time and not determining too quickly how and what kind of support the student needs appears to contribute to individually tailoring the process.

The results here are in line with previous studies showing the usefulness of video feedback and video modelling to facilitate learning of motor skills [4,22] and adds insights regarding the long-term perspective. Similar results were found in a review by Ste-Marie et al. [23]. The interpersonal interaction and the reflective process, which is a feature of this study, were however, not emphasised in these studies. Ste-Marie et al. [ibid.] did, however, recognise the knowledge gap in how to design observational learning of motor skills to motivate change and support individual self-efficacy. Our results suggest that using the video-based learning model could be an example of observational learning where a combination of modalities creates meaning in movement learning.

Polsgrove and Lockyer [24] have described the Holistic Approach to Developmental Movement Education which is a systemic and dynamic-based model to facilitate and optimise movement changes through specific tailored instructions. The model emphasises, among other things, the interactive process between the facilitator and the learner and the importance of developing a shared understanding of the performed movement. The results from this study showed that the video-based learning model supported the students in their understanding process of their own movements, which may support the development of a shared understanding of the performed movement. The learning
model used in this study furthermore emphasises and encourages a student-centred learning in which the student becomes active and owner of one’s own learning process. The importance of asking reflective questions and allowing the students to explore their own movements first was prominent. This suggests that a reflective attitude is to be recommended instead of providing the learner with instructions based only on the facilitator’s understanding of the movement.

Video feedback appears to be facilitating in the continuous long-term movement learning and reflection, which is suggested to encourage intrinsic motivation for future changes [25]. The facilitator’s approach of having a reflective attitude and being open for the variations in the learner’s movement learning process further appears to be paramount for accomplishing this. Furthermore, it appears to be important that the facilitator does not take on the role of an expert but remains on a mutual level, which is in line with the findings of Eskilsson et al. [26].

As previously mentioned, the long-term process could be described as; from doing and observing to reflecting and adapting. From a theoretical perspective, this resembles Kolb’s [27] theory on experiential learning, which implies that learning evolves in cycles such as through reflection on doing and making meaning of experience. Kolb described a model of experiential learning with four phases; concrete experience, reflective observation, abstract conceptualisation and active experimentation (ibid.), where one may approach learning starting in any of the phases. In our study, the session begun with a concrete experience can be exemplified by the movements performed during the sessions, and then followed by the video feedback and the facilitator’s open questions supported the students’ reflective observations. The abstract conceptualisation occurred in the process of awareness making and reformulating the movements. The active experimentation could be seen as the phase in which the students practiced their movements in different ways, during the session as well as in their daily lives. This latter phase was intended to strengthen the transferability of the learning model into various practical learning and teaching situations such as in physiotherapy training. These skills could also be a valuable contribution in, for example, multifactorial ergonomic interventions [12]. In the physiotherapist’s clinical practice for preventive or rehabilitative purposes this knowledge may add value in facilitating patients to gain a greater understanding and awareness of their movements.

Methodological considerations

The hermeneutic approach based on Gadamer [14] was found to be suitable for interpreting the variety of material. It was thus of great importance to continuously reflect upon the preliminary interpretations in relation to our pre-understanding in order to not allow our suppositions about the model to dominate the interpretation process. The research group consisted of persons with different experiences and competence, two nurses and two physiotherapists. This could be considered to strengthen the trustworthiness of the study as it provided a creative discussion about different possible interpretations during the process. The credibility could be seen as strengthened by the different sources of information, which included video recordings, interview transcripts and diary notes, and provided a broad perspective on the process of learning and change of movement. The interviews were carried out on three occasions, which is considered as a strength in the study as it captures the students’ thoughts and feelings from the intervention and also afterwards. It could, however, be difficult to remember experiences from 1.5 years ago and the focus of the last interview was thus on their thoughts on how the experience from the intervention has impacted on their daily life. The interpretation process has furthermore been described in detail. All participants reported musculoskeletal symptoms at the beginning of the study, which might have impacted on the results, as they could have been particularly motivated to learn more about their movements from the beginning. This means that we do not know about how this model would be experienced among a population without symptoms and the results would probably be more direct transferred to people with experience of musculoskeletal symptoms. The simplicity of the pre-selected movements and how they could be useful in daily life activities could be questioned. The results show, however, that the students transferred the skills and noted benefits in different everyday physical activities. We thus suggest that focussing on the basic principles of individual gentle movements, such as movement initiation and force application, may be valuable in the understanding and changing of a person’s own movement patterns in general.

Conclusions

The complex long-term process of movement awareness and learning was facilitated by various aspects of the learning model used in this study. Interactive video feedback modelling represents a challenging experience that leaves an emotional long-lasting impression on a personal level that supports motivation and a deep approach to learning. The video-based learning model adds a powerful base for personal reflection, which encourages student-
centred and active learning. The facilitator’s reflective approach is essential in this process to allow the student to explore her/his own movement and to become aware of the needs for movement change and how to change, in contrast to delivering instructions. The facilitator’s reflective approach also seems to be important in creating a safe and non-judgmental learning environment in a situation that can be experienced as challenging. The learning model may be a valuable contribution for physiotherapists and other movement practitioners in the clinical work to facilitate movement awareness in the process of movement improvements and gaining health.

**Ethical approval**


**Acknowledgements**

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**Disclosure statement**

No potential conflict of interest was reported by the authors.

**Abbreviation list**

**References**


Abbreviations

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