



Ear Irrigation to the Elderly: Educational Video for Degree Nursing students

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Aging is characterized with natural deterioration in the physiological functions of the elderly. One of the most common conditions attributed to aging is hearing impairment. It has been established that individuals often seeking care for hearing problems are mostly diagnosed with cerumen impaction, and the elderly are among the highest population. This affects the general wellbeing of the elderly population. This condition aggravates communication difficulties, increases loneliness due to social isolation, affects mental wellbeing and even may result to immobility. Cerumen impaction can be removed by mechanical means through ear irrigation. Thus, knowledge of ear infections and ear irrigation skills are vital for caring for the elderly. It is the responsibility of nurses to possess the required knowledge and skills for care of common diseases suffered by the elderly. Teaching nursing students these psychomotor skills have become necessary.

Nursing education entails the learning of clinical skills that are applied in real clinical settings by nursing students. To achieve this, nursing educators have developed different methods to teach students psychomotor skills required for nursing interventions. Combining the use of technology with traditional mode of teaching has enhanced learning. The use of instructional videos in teaching or learning of nursing skills have proven to be a viable method for improving psychomotor skills. Videos have been found to enhance the psychomotor learning of nursing students, as they help relate theory to practice. Therefore, teaching students the process of ear irrigation by means of an instructional video, would enhance their knowledge about the indications for ear irrigation and impact the skills to perform the procedure. This thesis was aimed at creating an instructive educational video for international nursing students on the procedure for performing ear irrigation. The purpose was towards increasing international Nursing students' knowledge on ear irrigation, and to fill the current gap in audio-visual nursing education on ear irrigation in the elderly in Finland. The result of the project implementation showed that majority of the students found the instructional video to be informative and suitable for learning ear irrigation procedure.

Keywords: Ear Irrigation, Nursing student, Elderly people, Educational video

Contents

1 Introduction	5
2 Theoretical Framework.....	6
2.1 Anatomy of the Ear	6
2.2 Physiology of hearing.....	7
2.3 Indications for Ear Irrigation	7
2.4 Ear Irrigation and the Elderly	8
2.5 Ear irrigation procedure	9
2.6 Instructional Video as a Clinical Learning Tool	10
3 Purpose and Aim.....	11
4 Methodology	11
4.1 Co-creation	11
4.2 Planning the co-creation	12
4.3 Forming Co-operation with Partners	12
4.4 Project Preparatory Phase	13
4.5 Implementation Phase	13
4.6 Evaluation Phase.....	14
5 Results	15
6 Discussion	18
6.1 Students' experiences of the quality of the video	18
7 Ethical Considerations	19
8 Trustworthiness	20
9. Conclusions.....	21
10 Appendix	21
11 References.....	23

1 Introduction

Aging has been viewed as a gradual process of biological changes over a course of time. Globally, the elderly is categorized as persons above the age of 65 years (OECD, 2022). The global population of the elderly has increased significantly over the years. The United Nations world population aging report (2019) indicates that the global population of persons aged 65 years and above was about 703 million in 2019, and the figure is projected to exceed 1.5 billion by 2050. This increasing rate of aging in the global population could be viewed as both a challenge and an improvement in healthy living. While it signifies a positive result in achieving the goal of healthy aging, the increased elderly population have resulted in high demand for both primary and specialized care for these individuals. (WHO, 2018.) In Finland, the elderly constitutes approximately 23% of the population, making it the 2nd highest elderly population in Europe (Clark, 2022). The government has acknowledged the need to cater for this group; hence social and health services targeted at the elderly are being implemented (Smirnova & Fleischhauer, 2020). These policies establishing the services are implemented taking into consideration the increasing elderly population. The population projections indicate that 75-year-old individuals will be more than one million by 2065, while the number of the people below 45 years will steadily decline by 2070 (Clausnitzer 2021). Furthermore, the Finnish Institute for Health and Welfare (2021) predicts the effects of the increasing elderly population as posing a future challenge to the healthcare system as the elderly population is projected to increase to 29% by 2060.

With aging and changes in the human biology, presents an increased risk of diseases and mortality. The common diseases in the elderly include hearing impairment, visual impairment, and other non-communicable diseases (WHO, 2021). A study by Mikkola et al. (2016) found that although several factors, such as socioeconomic issues and comorbid diseases, are confounding variables that worsen hearing problems, age is the most critical factor because of sensorineural challenges as individuals grow older. According to the global estimates on hearing disability, about one-third of the population of persons above 65 years have hearing impairments (WHO, 2012). In Finland, the result of the cohort study conducted by Mikkola et al. (2016), showed that 43% of the participants had hearing difficulties, while 16% had full hearing loss. Also, hearing impairment significantly affects the quality of life of the elderly population. It often leads to the development of cognitive impairment, decreased socialization, and hinders the performance of the activities of daily living (Burge et al., 2013). This would lead to an increased need for care and other health services. Thus, it is important to maintain healthy auditory functioning in the elderly.

Furthermore, one of the common biological factors that lead to hearing impairment is the accumulation of cerumen (ear wax) in the ear (WHO, 2021). This health challenge could be prevented by cleansing the ear through a process termed as ear irrigation. Ear irrigation is the process of removing cerumen (wax) from the ear by flushing, using water (NHS Foundation Trust, 2020). It has been viewed as a safe routine procedure to rid the ear of cerumen and foreign bodies, and to prevent age-related hearing disabilities. For nurses, the skills for ear care are a necessity (Solheim, Shiryaeva and Kvaerner, 2016). Considering the prevalence of hearing disabilities in the elderly (Solheim et al., 2016), it is important for nurses to have knowledge of common conditions affecting auditory functions in the elderly, and the procedures for their prevention. Therefore, this thesis was aimed at creating an instructive educational video for international nursing students on the procedure for performing ear irrigation. The purpose was towards increasing international Nursing students' knowledge on ear irrigation and aiming at filling the current gap in audio-visual nursing education on ear irrigation in the elderly in Finland.

2 Theoretical Framework

2.1 Anatomy of the Ear

The ear is the organ responsible for the functions of hearing and balance. Anatomically the ear can be divided into four distinct parts: outer and middle ear, and the auditory and vestibular parts of the inner ear which play a distinct function in the auditory process (Irwin, 2006).

The outer ear: The outer or external ear comprising of the pinna and external auditory canal is the visible part of the ear. This part of the ear is made of elastic cartilage, protected by skin. The shape of the pinna aids in channeling and amplifying sounds, while the external auditory canal accumulates sounds in the tympanic membrane and houses glands that produce cerumen that protects the inner ear. (Szymanski & Geiger, 2021.) This cerumen is the ear canal's natural lubricant, which aids the ear to undergo self-cleaning and lubrication (Shokry & Filho, 2017). The visible surface is divided into several parts: the antihelix, helix, anti-tragus, and tragus, collectively forming the external acoustic meatus which is the beginning of the external auditory canal (Sánchez López de Nava & Lasrado, 2020).

The middle ear: This region of the ear is located between the tympanic membrane and the oval window. The function is to transmit sound from the outer ear to the inner ear. It is comprised of the hammer, anvil, stirrup, and the eustachian tube. (Sundar, Chowdhury, & Kamarthi, 2021.) It has lower and upper compartments, called tympanic and epitympanic chambers, respectively. The middle ear is near major organs such as the mastoid, carotid artery, eustachian tube and jugular vein (Sánchez López de Nava & Lasrado, 2020). Providing protection for the hammer, anvil, and stirrup are two muscles which prevent the bones from vibrating, thereby reducing the intensity of the sound being transmitted to the inner ear (Sundar, Chowdhury, & Kamarthi, 2021).

Inner ear: This region is the most delicate part of the ear structure, comprised of the cochlea and vestibular system. The inner ear performs the functions of detecting sound and providing balance for the body. Though the region has two parts, the cochlea has been referred to as the most important part of the ear, as it contains a lot of nerves that transmit nerve impulses to and from the brain. (Sundar, Chowdhury, & Kamarthi, 2021.) The two component parts of the inner ear are separately responsible for one function each. While the cochlea is positioned for sound conversion and transmission to the brain, the vestibular system is responsible for providing balance for the body. (Bruns, N.D.) See a depiction of this part in Picture 1.

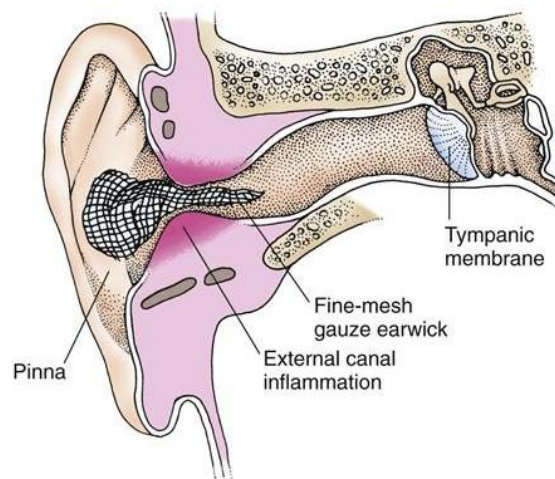


Figure 1: The Inner Ear. Source: Bierschbach (2016)

2.2 Physiology of hearing

The hearing phenomenon requires the transmission of sound and their subsequent interpretation. The ear hears sounds through vibrations produced by the movement of particles in the environment where the sound is produced. (Raghu, 2018.) The ear is uniquely designed and equipped to identify these sound waves and distinguish between pitch and loudness attributes (Sánchez López de Nava & Lasrado, 2020). A sensitive ear can hear sound frequencies that range from 20Hz to 20,000Hz. Thus, the range of hearing in human beings is limited as some frequencies fall below 20 hertz. (Sundar, Chowdhury, & Kamarthi, 2021.) In the hearing mechanism, the outer ear collects and localizes sound waves which travels to the middle ear and is lodged in the tympanic membrane. The major functions of the middle ear are to reduce the intensity of sounds being transmitted, and to transmit sound waves to the inner ear. (Hayes, Ding, Salvi, & Allman, 2013.) Sounds waves are being processed and converted in the inner ear by the cochlea. They function by converting sound vibrations into electrical impulse, which is then transmitted to the brain. This organ simultaneously works with the vestibular system to facilitate balance. Hence, the ear serves dual functions of hearing and maintaining body balance. (Sundar, Chowdhury, & Kamarthi, 2021.)

2.3 Indications for Ear Irrigation

Numerous infections and disorders plague the ear, and these hinder its effective functioning. Essentially, hearing impairment is attributed to age, medication side effects, disease, and injury. (Duthey, 2013.) These issues manifest through a variety of conditions. Researchers have investigated several factors that often results in ear irrigation (Schumann, Toscano, & Pfleghaar, 2021). One of the underpinning issues is the failure to treat otitis media through locally available options (Hospu, Närkiö-Mäkelä, & Silvola, 2011). Most often, individuals' resort to use of ear drops to mitigate the challenge (Aaron et al., 2018). However, according to Hospu et al. (2011), the Finnish market lacks sufficient and well proven ear drops that people can rely on without the risks of ototoxicity. Consequently, the use of topical treatment, such as ear irrigating, is often the most advisable option in Finland. A second precipitator of ear irrigation is when the cleaning mechanism of the ear is interfered with. Excessive ear wax production can cause itchiness, pain, hearing impairments, and more issues that necessitate ear irrigation.

(Hospu et al., 2011.) It has been established that individuals often seeking care for hearing problems are mostly diagnosed with cerumen blockage. This condition is more prevalent in men compared to women, and the elderly are among the highest population with cerumen obstruction incidence. Furthermore, an indication for cerumen evacuation is considered when there is blockage of tympanic membrane or symptoms related to hearing loss. (Cooper et al., 2018.) Several interventions have been seen to be effective towards cerumen evacuation such as the use of ear drops or mechanical dry and wet approaches (Rodriguez et al., 2022). A common practice among the general population involves attempting to clean their ears using cotton swaps and Q-tips. Due to the ineffectiveness of these approaches, the earwax migrates to the back side of the ear and accumulates over time. (Wright, 2015.) Hence, as individuals age, their ears are clogged because the accumulation of ear wax becomes drier (Hospu et al. 2011). In such a situation, mechanical cleaning and irrigation becomes the most appropriate treatment (Schumann, Toscano, & Pflagher, 2021).

2.4 Ear Irrigation and the Elderly

Although cerumen plays a crucial role in protecting the inner ear against foreign bodies and infections, it has been established that cerumen impaction has a significant effect on the wellbeing of the elderly. Cerumen impaction may lead to vertigo tinnitus, pain or even in hearing difficulties that may reduce acuity by 40-45 decibels. (Oron ,2011.) According to Oron (2011), cerumen impaction is a common problem affecting up to 65 % of those 65 years and above. This condition aggravates communication difficulties, loneliness due to social isolation, mental wellbeing and even may result to immobility. It has further been established that due to biological changes in the auditory function in the elderly, cerumen impaction may be confused as a normal biological change and hence remain untreated for long periods. (Oron ,2011.) Hearing loss has been related to reduced cognitive ability and dementia. In a study where a mini-mental state exam (MMSE) was carried out on the elderly with cerumen impaction in one or both ears, the results showed a significant positive outcome after cerumen clearance. Thus, poor hearing was associated with lowered MMSE score. (Sugiura et al., 2014.)

Cerumen removal can be done using physical and chemical also referred to as cerumenolytic methods or both. Physical method involves, suction, irrigation, or use of forceps. Cerumenolysis entails the use of cerumenolytic products that soften the cerumen and lubricate the ear canal hence facilitating the evacuation of cerumen. (Oron ,2011.) Mechanical or physical methods of cerumen removal are classified as dry and wet. Dry intervention takes the use of ear curette under a microscope. Wet intervention involves the use of water whose warmth is at body temperature, and this procedure washes out the cerumen. In many cases both methods are applied whereby cerumenolytic substances that are oil based, water based, oil and water based, and non-oil or water based are used to soften the cerumen before undertaking a mechanical procedure through irrigation. (Cooper et al., 2018.)

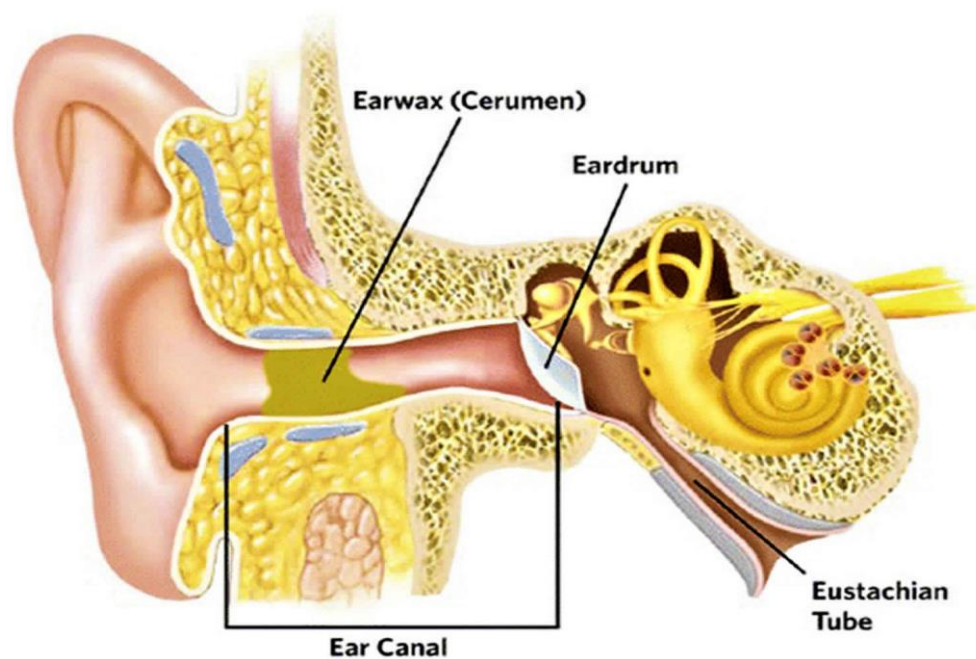


Figure 2: Cerumen impacted ear. (Source: Healthjade.net)

2.5 Ear irrigation procedure

There are categories of elderly patients that do not qualify to have an ear irrigation. Thus, considerations and health checks ought to be performed by the nurse before an ear irrigation procedure is undertaken. Ear care guidelines provide that the health history of the patient should be checked for any report of having undergone an ear surgery, or any contra-indication against ear irrigation. Again, the frequency of ear irrigation should be checked as well to prevent increase in the secretion of cerumen due to frequent irrigation. (UK Ear irrigation Guidelines, 2019.) Furthermore, there are circumstances that would preclude an elderly patient from undertaking the ear irrigation process. The process is contra-indicated in patients who are unable to sit upright or to sit still, patients with perforated tympanic membranes, patients that have undergone an ear surgery, patients that have has a face trauma, and patients with middle and inner ear diseases. (Hayter, 2016.)

Vital steps are essential before the nurse commences the ear irrigation process, to wit: checking the patient's medical history for contra-indications for ear irrigation, physical examination of the ear (external & internal), explaining the procedure to the patient, and gathering all the required equipment for the irrigation procedure. (Schumann et al., 2021.) Before the flushing process, the wax in the ear can be softened using ear drops or oil. Most often, this process is conducted few days earlier to avoid irritating the ear during the procedure. (Roland et al., 2008.) It is unsafe to attempt to remove the cerumen manually by introducing foreign materials into the ear. Khan, Thaver & Govender (2017) noted that inserting anything into the inner ear can harm the organs responsible for hearing. Although it is advised to cleanse the ear of cerumen when it has become impacted, the cerumen is vital in protecting the ear from infection through bactericidal aspects and high pH levels that make the ear region unsuitable for other microorganisms (Khan et al., 2017). This process calls for nurses to remove the cerumen through ear irrigation. Initially, the nurse begins the procedure by assembling the appropriate equipment. It is recommended that the nurse have an otoscope, cerumenolytic, warm water, 60ml syringe, and an irrigation basin. (Schumann, Toscano & Pflieger, 2021.)

Globally, various methods are used to soften the cerumen before the ear irrigation process is carried out. In some regions, the wax is softened beforehand using mineral oil and sodium docusate or carbamyl peroxide (Schumann et al., 2021). According to Hospu et al. (2011), there is limited evidence about the most effective approach to soften the ear wax compared to saline and water. The next step is to explain the procedure to the patient and guide the patient to sit in an upright position. A syringe pushes water through the cartilage bone junction (see Picture 2). One should be careful to avoid trauma or perforation of the tympanic membrane. At the end of the irrigation process, excess water should be cleaned using a cotton wool/swab or paper. Also, the ear should be examined to determine the effectiveness of the procedure, and the observations documented. (Ear Irrigation Guidelines, 2019.)

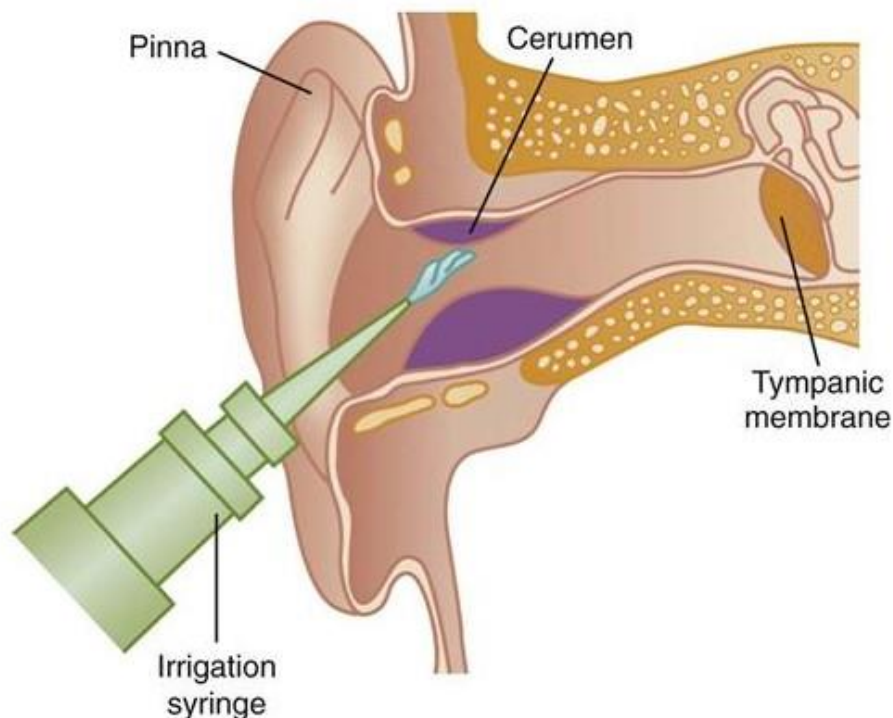


Figure 3: Ear Irrigation Using the Irrigation Syringe. Source: Bierschbach (2016)

2.6 Instructional Video as a Clinical Learning Tool

Nursing education entails the learning of clinical skills that are applied in real clinical settings by nursing students. Videos have been found to enhance the psychomotor learning of nursing students, help relate theory to practice and enhance learning. This in return has a significant effect on the quality and safety of delivered care. (Forbes et al.,2016.) Videos provide the opportunity for nursing students to learn using various sensory modes. Videos also provide the opportunity for learning and relearning by going through a recording many times. (Kim et al., 2017.) It is also to be noted that in the current world technology enhanced learning is an evolving field due to less limitation in time and place of learning. Nursing education has also taken strides towards the use of technological approaches towards enhancing student learning and competence development. (Clerkin,2022.)

Traditional learning approaches often heavily depend on teacher-centered lectures and grasping of theoretical concepts from books. However, a paradigm shift has been evident with the spread of information communication technology; educators are combining visual and auditory tools to improve knowledge synthesis. (Forbes et al., 2016.) Salina et al. (2012) observed that videos are essential in stimulating learners' understanding in different settings, such as the laboratory, classroom, and even remote learning. Researchers have delved into the significance of videos in enhancing clinical skills education from various dimensions (Forbes et al., 2016). Furthermore, when videos contain realistic contents, the learning outcome is heightened (Alfes, 2008). It affords the students the opportunity to replay the video and revise the skill being portrayed as much as possible, until the student is satisfied with the level of skill competence. (Clerkin, 2021.) Thus, the student acquires both theoretical knowledge and practical skills through demonstrations in instructional videos.

3 Purpose and Aim

The purpose of this thesis is to increase Nursing students' knowledge on ear irrigation and to fill the current gap in nursing education with the Aim of creating an instructive educational video of an ear irrigation performed to the elderly by a caregiver for nursing students. The audiovisual material will be based on the evidenced practice in Finnish health care context. Its key highlights will include approaches to care for the ear. For nurses, the skills for ear care are a necessity. Specifically, the proposed educational video will give a clear guidance on promoting the ear care and basically the "do" and the "don'ts" when carrying out an ear irrigation. The video will focus on the elderly population because they are the most vulnerable to hearing problem.

4 Methodology

4.1 Co-creation

This project adopted co-creation as the methodological approach. Co-creation, also referred to as co-design or participatory design, is defined as creative collaboration between designer and end user towards the development of a product (Mansson et al.,2020). Co-creation has extensively been used in the business sector and industrial services to innovate new products through collaboration, where customers and decision-makers collaborate to achieve the desired outcome. In the healthcare sector this approach has been adopted mostly towards developing new patient-centered services (Zhang, Tong, Demirel, Duffy, Yih & Bidasse, 2015.) The core merit of the methodology is that it focuses on the recipients' satisfaction and enables the decision-makers to gain important information that they can use towards improving the quality of the end-product (Mansson et al.,2020). In the context of this thesis co-creation was pivotal in enhancing nursing student's understanding of the ear irrigation process since the instructional video was tailored towards supporting learners' learning process and enhancement of psychomotor competences. This project adopted the four phases of project co-creation: planning, forming cooperation with partners, project preparatory phase, and the implementation phase as elaborated by Interreg (2020).

4.2 Planning the co-creation

Formulating an idea for a project is the first phase of planning. In planning the project, several variables must first be determined and defined. There should be set aims and objectives for embarking on the project, the resources and equipment required for the project is clearly outlined, the partners and stakeholders are specified, and the beneficiaries of the project defined. (Interreg, 2020.) In applying this step of co-creation in the thesis, the authors clearly formulated the aims and purpose of the thesis project, identified the equipment and resources required for the video creation, identified nursing students, supervising teachers, and Laurea university of Applied sciences as the contributing partners in the co-creation project. Also, the thesis used various references and evidence-based guidelines to explain the phenomena of ear irrigation in the elderly, use of instructional video for nursing education, as well as the application of co-creation methods to the project.

The instructional video was created to meet the quality and standards of a good educational video. According to Brame (2016), cognitive capacity, non-cognitive factors that affect interaction, and features that encourage active learning are the important elements to be considered in creating an educational video. Studies have noted the qualities of an instructional video to include having a clear aim of what is intended for the learners to achieve after watching the video. Also, the length of the video should be reasonably short to sustain the interest of the learners, and reasonable use of texts to explain important contents the learners should pay attention to. (Beheshti et al., 2018.) Furthermore, some studies suggest the use of voice in scripting videos to accommodate all categories of learners. This provides the option of learning by listening to the audio alone or learning with both audio and visuals. (Hebb, 2015 as cited in Beheshti et al., 2018.) In creating videos that support learning, it is important to eliminate components that do not meet the aim of the video (Buchner, 2018). Including extraneous components like music, and background designs that do not contribute to the video is disadvantageous as it increases the cognitive load of the learner (Brame, 2016). The instructional video for this thesis incorporated the essential qualities of a good video. The scripting was kept short and simple. Also, the video included texts to explain important concepts.

4.3 Forming Co-operation with Partners

The second step in co-creation involves establishing a relationship with the various partners. The roles and responsibilities of each partner must be defined. The resources to be contributed by the partners are outlined, and their availability when needed ascertained. (Interreg, 2020.) For the purposes of this thesis, the responsibilities and contributions of all partners were delineated. The focal partners of the co-creation identified the roles each partner would play and assigned responsibilities according to their capacities. The outline and assignment of responsibilities to partners was guided by the thesis writing guidelines of Laurea UAS. The wishes and expectations of each partner in an ear irrigation instructional video was sought and obtained. As a partner, the responsibilities of Laurea UAS was to provide all the equipment needed to create the video, as well as the required consent for nursing students to participate in the project. The V Module students who were undertaking their thesis writing process were selected as the users for the instructional video. The students' contributed by watching the video and their feedback was collected by use of a questionnaire.

4.4 Project Preparatory Phase

At this step of the co-creation, the partners have gathered the necessary resources to start the project implementation. All barriers to the implementation of the project would be assessed at this stage. The project can only succeed if all the partners in the co-creation contribute their resources when needed. Any insurmountable barrier identified at this stage would negatively affect the project process. (Interreg, 2020.) At the preparatory phase, all the equipment required for the video creation was assembled. Lastly, the manuscript for the video creation was prepared based on the principles in the cognitive theory of multimedia learning. The multimedia principle postulates that humans learn from auditory and visual channels, and each of these channels have a limited capacity. Therefore, learning by only one channel overburdens the channel as each channel has a limited capacity (Myers, 2009.) Thus, it is more beneficial to include both audio and visual representations when preparing an instructional video. The application of the principle in the creation of instructional videos reduces the addition of extraneous information that would overload the student's cognitive capacity (Sweller, 1990 as cited in Khalil & Elkhider, 2016). The video manuscript was written while factoring in the cognitive load, by adding only necessary information required for learning about ear irrigation. Since a mannequin was used for the video, the manuscript was scripted hypothetically towards a scenario that the medical history of the mannequin (patient) had been checked for any contra-indication for ear irrigation, that would render an ear irrigation procedure unimplementable.

4.5 Implementation Phase

At the implementation phase, the co-creation project is carried out. The focal partner would be responsible for implementing the project. The partners with the duty to give evaluation will monitor the development of the project. (Interreg,2020.) for the thesis, it is at this stage that the instructional video was created. The first step in creating an educational video is to define the aim and create a scenario that requires a solution. The next phase is the preparatory stage where the manuscript would be written. Lastly, the video is produced using the essential guides of video creation, incorporating audio and text. (Buchner, 2018.) After the first video was created , feedback on the quality of the content of the video was rated as below average, there was miss spellings of the subtitles and some of the scripts written were not shown on the video for example when checking the ear with an otoscope ,the expectation were to show an healthy eardrum versus infected eardrum, secondly the contra-indication signs were just mentioned but were not outlined, the sub-titles were not matching the actions on the video , the colour coding did not match the partnering official colours and as a result the quality of the content of the video was not outstanding, all extraneous components were reviewed and eliminated. The final product was sent to the module V nursing students together with a questionnaire, to inquire about their user experience and to give feedback.

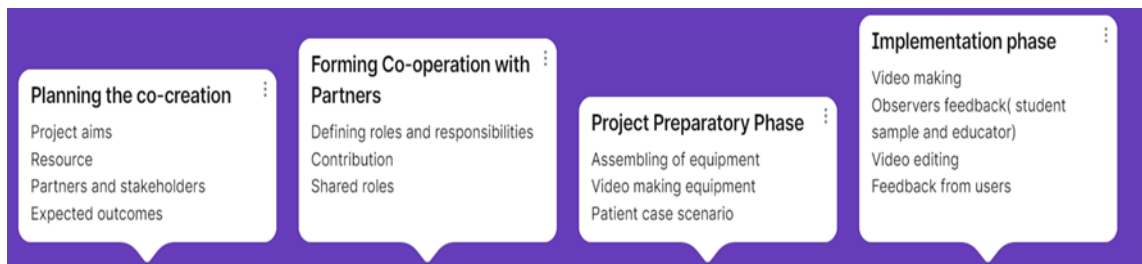


Figure 4: Summary of the co-creation process.

4.6 Evaluation Phase

This is the final stage of the co-creation process. For the purposes of evaluating the achievement of the objectives of the thesis, feedback was sought from module V nursing students. Evaluation was conducted after the recording and editing of the video had been completed. The Module V nursing students selected by purposive sampling and who consented to observe the procedure, as well as the supervising teachers were sent the video to watch and give feedback. The video was sent to the participating students via email with a survey questionnaire form attached, an introduction letter clearly showing the purpose, aim and confidentiality for them to give feedback after watching the video. The students selected purposely from the Module V students to participate in the survey unanimously and willingly without any compensatory gains. Research permission was sought and obtained from Laurea UAS, prior to the implementation of the project. The evaluation and feedback for the video was obtained using an online application programme google forms questionnaires survey and reporting tool. In the survey form, students were asked the following questions:

1. Are you a final year Nursing student?
2. What is your evaluation of the quality of the video?
3. What is your evaluation of the content of the video?
4. How relevant and helpful is this video to nursing students?
5. Would you recommend the video to be shared to nursing students for learning?

The feedback was necessary to evaluate the effectiveness of instructional video as a learning tool in nursing education, and to assess whether the objective of the thesis had been achieved. As part of the thesis, the feedback and evaluation were used for the analysis and discussion of the results of the co-creation project.

Students' experiences of the quality of the video

The feedback reported by the students of their user-experience about the quality of the instructional video are consistent with previous research by Beheshti et al. (2018), who reported that a good video should be simple and short to keep the students engaged for the whole length of the video. The importance of creating short instructional videos for students' learning, has been based on the cognitive load theory. This theory postulates that the human memory has limited temporary storage capacity, hence the selective processing of information

to save for the long term (Brame, 2015). Thus, the longer the length of an instructional video, the less engaging it would be for students, thereby affecting the learning experience (Guo, Kim, & Robin, 2014). The findings of previous research are in accord with the feedback described by the students regarding the appropriateness of the length of the instructional video.

Experiences of the use of voice narration and text in the video

The feedback given by the students on their wish to have a voice narration of the ear irrigation procedure included in the video, is comparable to the earlier research by Brame (2016). The authors opined that using voice narration in instructional videos enhances the students' learning experience. Also, including texts alongside verbal narration in an instructional video has been shown to improve students' engagement and prolongs the attention span, as the students have the option of watching the video and reading the texts or listening to the audio alone (Beheshti et al., 2018). The experiences of the students about the inclusion of texts in the video is consistent with earlier research which viewed the addition of texts as aiding in the retention of student's attention during learning. Having both texts and verbal narration in an instructional video is beneficial to all categories of students and situations, as students with visual and auditory impairments have options to learn using the video (Beheshti et al., 2018)³³. However, students' experiences and the work of some researchers contradict the principle of multimedia learning as propounded by Mayer (2014), which views the use of texts alongside verbal narration in a video as being redundant. The experiences of some of the students with regards to the more effective combination between a video with texts, and a video with verbal narration is in accord with the principle of multimedia learning. An educational video with verbal narration has been shown to provide a more effective learning experience than an instructional video with just texts.

Experiences of the use of background music

The students reported opposing experiences about the use of background music in the instructional video. The same situation presents with earlier studies, as there are varying opinions about the effect of including background music in an educational video. Brame (2016) recommends eliminating all background sounds in an instructional video that do not improve the learning experience of students. The rationale is that such extraneous additions increase the cognitive load of the video and can potentially distract the students' attention. Also, the study by Kampfe et al. (2010), noted a negative effect on learning outcome where background music is present. This is comparable to the experiences reported by some of the students, as being distracted by the loud background music. On the other hand, the study by Herbert (2011) opined that background music could be used to maintain students' attention and prevent auditory distractions. The findings in this study corroborates the experiences of some of the students about the instructional video.

5 Results

The final version of the instructional video produced from the co-creation partnership was sent to the module V nursing students, to watch and give feedback of the user experiences. A free form questionnaire was attached to the video for the students to write their experiences after watching the video. The responses of the participants were represented in both charts and free text format. A total of Fifteen (15) students gave feedback for the instructional

video. The student's description of their experiences is categorized under the following headings:

Quality of the video

Majority of the students described the video as easy to follow and having an organized structure and clear content. About 60% of the respondents gave good feedback about the use of background music, and texts in the instructional video. Less than 10% of the respondents gave poor ratings about the use of background music, consistency, and organizational structure of the video. In the feedback about their experiences written in free text format, nine of the students described the quality of the instructional video positively. Some of the feedbacks about the quality of the video stated "video quality is very good", "it is good quality", "pretty good", "great video with good and important content", "Video quality was good. Sometime may be close-up shoot would have been better", "The music is suitable and brings positive energy to the video", "Not sure about the music".

Overall Impression/Quality of the video
15 responses

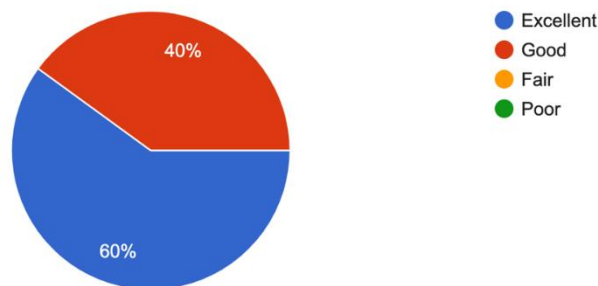


Fig 5: Result of thesis study

Contents of the video

On the question about the opinion of the respondents on the content of the instructional video, 80% describe the video as having useful educational contents, while 20% responded that the video was good and appropriate for the purpose. The students described the video in the following words: "Very clear and easy to follow", "Very informative", "Well-selected and presented content", "it is very useful and helpful video", "clear content", "looks appropriate".

EVALUATION OF CONTENT OF THE VIDEO

15 responses

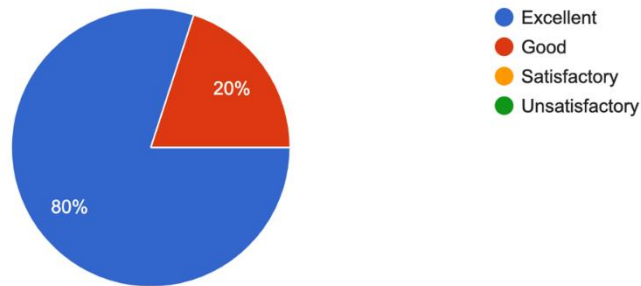


Fig 6: Result of Thesis study

Relevance of the instructional video

To the question about the relevance of the video for education of nursing students, about 67% gave excellent feedback, 27% felt the video was of good relevance in nursing education, while about 7% described the video as being of fair relevance. The feedbacks given by the students described the relevance of the video to learning ear irrigation as follows: " Learned a few new things about ear irrigation, thanks", "The video is kept brief and targeted on learning goals".

How relevant and helpful this video is for the nursing Students?

15 responses

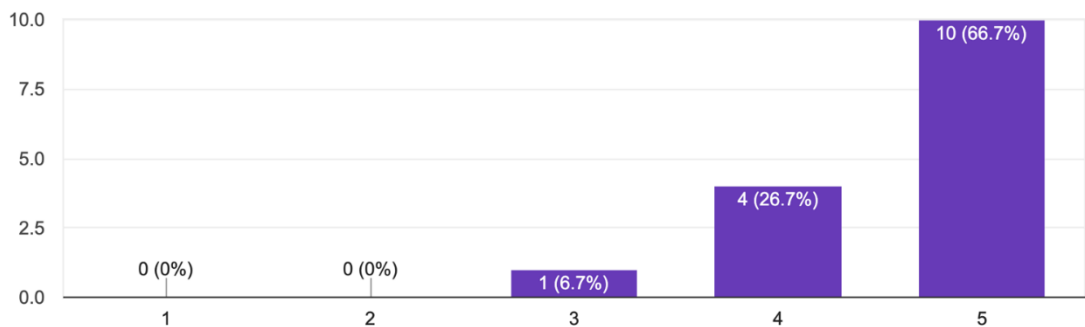


Fig 7: Result of thesis study.

Recommending the video to nursing students

When asked whether they would recommend the video to nursing students, 93.3% of the participants answered in the affirmative, while 6.7% indicated that they were uncertain

about recommending the video to other nursing students. The feedback from the students is as shown in the pie chart below.

Would you recommend the video shared for educational purposes to nursing Students?

15 responses

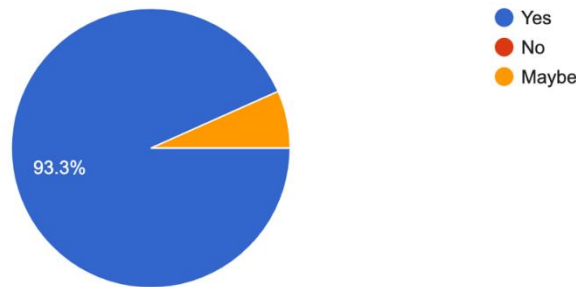


Fig 8: Result of Thesis study.

6 Discussion

6.1 Students' experiences of the quality of the video

The co-creation project set out to create an instructional video on ear irrigation procedure in the elderly. The process of creating the instructional video was conducted in phases. At the preparatory phase, the partners wrote the manuscript for the video, and assembled all the required equipment. This phase of the project was more demanding, as it was crucial for the video-shoot proper. The video creation and editing were done taking into consideration the wishes of the various partners. On the day of the project implementation, the focal partners performed the ear irrigation procedure, while a designated person videoed the procedure in the presence of some of the student-partners and the project supervisors. At the end of the project, the video was sent to the Module V students to watch and give feedbacks on their user experiences. In the project, the students identified the qualities and contents that aided their learning of ear irrigation procedure in the video. Also, the students gave feedbacks about the expectations they would have wanted to be reflected in the video.

Notwithstanding the successful creation of the video, there were limitations in the project as reflected in the feedback given by the students from their user-experiences. The camera did not get a close shoot of the internal part of the mannequin's ear, so the students could not see how the ear was being cleaned. Thus, the success of the ear irrigation process could not be evaluated. Also, the wishes of all the partners could not be accommodated in the video. This was reflected in the feedback about the inclusion of background music in the video. While some students found the music to be distracting, others expressed that it aided their learning process.

The feedbacks from the user-experiences showed the shortcoming of the video, as well as the preferences of students in an instructional video. In co-creating the video, the researchers learnt the effect of the length and content of an instructional video on learning outcomes. Also, it showed that students learn differently, and the advantages of blended learning in nursing

education. A different approach that could have been adopted in creating the instructional video would have been to use voice narration to explain the ear irrigation procedure. Again, information that are considered important to highlight for emphasis would be written boldly in texts in the video.

7 Ethical Considerations

Several ethical values will be observed during this study. First, the participants will provide explicit consent before they participate in evaluating and giving feedback on the ear irrigation educational video. According to the Finnish Board on Research Integrity, when conducting research in human sciences, those involved must be informed about the purpose and objective of the study in a way that they understand, and they should voluntarily accede to the request of their involvement (TENK, 2019). Hence, the participants would be informed about the aim and purpose of the thesis, and their agreement to participate would be documented. Specifically, the project will collect feedback from students and teachers about the effectiveness of the instructional video in enhancing their knowledge. However, before this process a formal request would be made to Laurea University of Applied Sciences to obtain a permit from the designated research office. This step will ensure that the thesis adheres to the stipulated ethical consideration that requires an approval from both the research institution and the participants.

Moreover, the participants who would provide feedback, especially the students would be informed about the purpose of the research and their rights as respondents. As specified by TENK (2019) the autonomy of the participants' understanding of a research purpose is pivotal to ensure that they understand what they are involved in. Hence, detailed information about the thesis, purpose of project, the importance of the feedback, and what the feedback would be used for, would be provided in the invitation letter sent to students to participate in the project. Furthermore, since the participants' personal details will not be crucial in this thesis, the feedback would be coded using numerical values rather than store the data with their identities, as the ethical guidelines stipulate that the use of personal data must be accompanied by legal basis (TENK, 2019).

Authenticity and originality will be observed to the latter. As per the Finnish National Board on Research Integrity guideline, plagiarism is prohibited in scientific undertakings (TENK, 2019). The practice is condemned because it promotes dishonesty in scientific undertaking and in worst case scenario it may mislead the scientific community, an outcome that may derail growth in society. Therefore, to ensure that the work is original, all external sources and literature used in the thesis would be properly referenced.

To promote openness and transparency, all the data collected and used in the thesis will be accessible after the publication of this study. The Finnish National Board on Research Integrity recommends open science as a pre-requisite for critical evaluation of scientific undertakings (TENK, 2019). Hence, all the information will be accessible to ease further evaluation from different stakeholders in the nursing sector. Again, Individuals' safety is a critical concern, thus, the project would utilize an artificial representation of a patient (mannequin) in the instructional video. Since ear irrigation involves critical processes such as insertion of the syringe in the patients' ears, using a human being may be risky and inconveniencing due to several reasons. Firstly, complications may arise during the irrigation procedure and therefore putting the individuals' health at risk. Secondly, the movement of the patient may interfere

with the recording process. Therefore, the justification for using a mannequin to represent the patient with ear challenges.

8 Trustworthiness

According to Nowell, Norris, White and Moules (2017) define trustworthiness as the process of ensuring that readers and research recipients find the undertaking worthy and they can spend time to synthesize or analyze its content. Furthermore, they note that assessing the trustworthiness of a research should encompass four components: credibility, dependability, transferability, and conformability (Norris et al. 2017).

A credible thesis is believable and both researchers and audience agree about its appropriateness (Guba & Lincoln, 1989). Therefore, one of the essential roles of the researchers is to ensure that their representation of the participants or concepts under study is based on valid and accurate processes (Mohajan, 2017). In this thesis, credibility would be ensured by engaging in consultations with the thesis supervisors continuously, as well as obtaining feedback and evaluation from students.

Secondly, as suggested by Norris et al. (2017) the thesis will make use of and refer to multiple sources to minimize bias and enhance the credibility. Therefore, the functional video produced in this study will be widely applicable because the underpinning process is credible and authentic. The material will be created to benefit a healthcare setting and standard tools of operations will be employed during the process. Consequently, learners and other users of the materials will not be disadvantaged when they attempt to replicate the process.

Furthermore, the thesis process will ensure that the research is highly dependable. Norris et al. (2017) suggest that dependability is achieved by documenting one's work clearly and arranging its components logically to enhance traceability. Consequently, all reference and images used will be referenced in the bibliography. This step will enable readers to identify all the information used and trace them if necessary.

Lastly, to ensure the works' trustworthiness, all steps necessary for its transferability would be implemented. According to Norris et al. (2017), generalizability is the main aspect that is often tested when assessing transferability. One of the criteria to enhance the transfer of information is by providing elaborate description of the research findings and content to the audience so that they can assess whether the work can be replicated in different contexts (Polit & Beck, 2010). Hence, the project will provide vivid descriptions in both the thesis report and the educational video to achieve this objective. Secondly, the thesis has utilized both international and Finnish sources to ensure that audiences from other parts of the globe can comprehend and analyze its content before comparing it with their context. Since confirmability entails meeting the credibility, transferability, and dependability requirements (Norris et al. 2017), all the described steps will be implemented to ensure that the interpretations are deduced from the data.

9. Conclusions

Having the required knowledge and skill for ear irrigation is an essential nursing skill, particularly in countries with an aging population. Since the nursing profession involves providing care, having the required psychomotor skills is an essential condition in non for effective nursing practice. The use of instructional video in nursing education has been proven to improve knowledge and the psychomotor skills of students. The effectiveness of this method of learning can be seen from the experiences of the students who participated in the co-creation project. Notwithstanding the negative experiences described by students about the quality of the video, and the use of background music, most of the students described the video as suitable for learning ear irrigation procedure. Again, obtaining feedback about the user-experiences from the students, created an opportunity to understand the type of instructional video that in the opinion of students would best support their learning. This process improves the ability to create an instructional video that would be appropriate to enhance the psychomotor skills of nursing students.

10 Appendix

Appendix 1: Equipment

The tools used in the educational video:

- ❖ Patient (Mannequin)
- ❖ Otoscope
- ❖ 60ml syringe
- ❖ Irrigation Basin (Medi bowl)
- ❖ Warm water
- ❖ Remo-Wax (put Night before the procedure)
- ❖ Hand paper
- ❖ Apron
- ❖ Cotton buds
- ❖ Tables & chair
- ❖ Gloves
- ❖ Drape
- ❖ Hand Sanitizer
- ❖ Video camera

Appendix 2: Procedure

The following procedure for ear irrigation would be followed and implemented in the video creation.

- ❖ Patient (Mannequin) helped to the right sitting position (sit upright.)
- ❖ Nurses Introduction to the patient
- ❖ Patients' identification (Identity Card Confirmation)
- ❖ Check the patient's medical history for previous ear irrigation or any contra-indication for ear irrigation and confirms the ear wax has been softened the night before

- ❖ The nurses disinfect their hands, and check with an otoscope that the ear is healthy for the irrigation procedure (no signs of infection, or pain))
- ❖ The nurse explains the procedure to the patient
- ❖ Both nurses disinfect their hands, puts on the gloves and apron
- ❖ The patient is covered with a drape from sprinkling water
- ❖ Medi bowl is held in position
- ❖ Carefully The nurse pushes the syringe to release pressured water to get the wax out (checking with the patient always that there is no pain, dizziness, or nausea)
- ❖ Dry the excess water from the ear using paper and cotton bud
- ❖ The nurses dispose the used equipment's, disinfect their hands
- ❖ After the procedure, the nurse examines both ears for a successful procedure
- ❖ The nurse confirms with the patient in case of any questions, if there is none then ends the procedure
- ❖ Documents accordingly

Appendix 3: Video Script

Video Scene 1: introduction

The nurse will welcome the patient, in this case the mannequin will be brought into the room and conduct a brief introduction while taking the essential details including social security number. Next the nurse checks the medical history for contra-indications for ear irrigation, and then examines the ear for scaring symptoms or infection. The nurse also presents the indications for ear irrigation. Since the patient is a mannequin, it would be verbalized in the video creation that it is assumed Remo-Wax has been put into the ear to soften the earwax a night before.

Video Scene 2

One nurse positions the working table, both nurses disinfect their hands and put on the gloves to start the procedure.

The Nurses will then stand strategically in front of the camera near the mannequin and commence the preparation process as they explain all the steps.

Video Scene 4

After completing the preparation phase, the nurses will notify the audience and proceed with the ear irrigation process. During the video creation, the nurses explain to the patient what they are doing at every step, and what to observe during the procedure,

Video Scene 5

The nurses complete the procedure, checks the patient's ears again for a successful procedure, discuss with the patient about their current condition and advice the patient about ear care, and then document the procedure accordingly

Appendix 4

Final Video Link

<http://youtu.be/XfVmJoG8xpc>

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