MASTER THESIS

EDUCATIONAL SCIENCE AND TECHNOLOGY

The Relationship between UTAUT Constructs with Age and Technology Literacy Skills and Behavioral Intention to Use Video Technology Among Vocational Education Students in the Netherlands

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Abstract

Technology acceptance, especially video technology adoption, has become increasingly important in digital and online learning within schools and universities. However, there has not been much focus on the use of video within vocational education and training (VET). The purpose of this study is to identify which determinants contribute to the behavioral intention of individuals to adopt video technology, such as GoPro, by using the unified theory of acceptance and use of technology (UTAUT) model with moderator variables of age and technology literacy. Data was collected from vocational students in the Netherlands enrolled as underground infrastructure technicians using digital questionnaires. Confirmatory factor analysis and multiple linear regression were used for data analysis. The results reveal that performance expectancy had a significant influence on behavioral intention and was moderated by technology literacy. This research addresses insights into the adoption of video technology in Dutch VET.

Keywords: Vocational Education and Training (VET), technology adoption, unified theory of acceptance and use of technology (UTAUT), behavioral intentions, video technology

Introduction

Vocational education and training (VET) focuses on the development of students' knowledge, skills, and attitudes to successfully transition into a professional occupation. Workers with these integrated competencies are in increasing demand for the workforce. Yet one of the biggest problems in VET is connecting school and work contexts (Endedijk & Bronkhorst, 2014; Onstenk, 2017). Vocational learners experience a lack of integration of knowledge when transitioning between the two learning environments (Akkerman & Bakker, 2012). The transfer of explicit and implicit vocational knowledge is difficult to regulate, resulting in separated learning both in time and place (Schwendimann et al., 2015). Several studies have reasoned why a learning gap is present. The different company backgrounds of students attending together within vastly different school and work systems in pursuit of varying objectives have been observed (Akkerman & Bakker, 2012). To add, a lack of high quality coaches, evaluation, facilitation of learning, time for meeting project deadlines, and lack of cooperation between teachers and supervisors are also common concerns (Onstenk, 2017; Schwendimann et al., 2015).

As a solution, we argue that using the technologies involved in the Schwendimann et al. (2015) design to bridge the gap between the dual-learning contexts and different actors could foster knowledge integration. The Schwendimann et al. (2015) design is described as a transformative mechanism for individuals to improve their learning from experience. It involves the capturing of the direct work experiences of learners in two contexts where technologies such as video and audio are used. The effects of the technology-based design have been shown to improve individual learning outcomes, metacognitive skills development, self-efficacy abilities and professional identity (Schwendimann et al., 2015). And so, to capture the work experiences of VET students, videotaping could be integrated with the use of a head mounted action camera such as a GoPro. Using an action camera would generate videos that can address the specific knowledge students need to become professionals as videos can display, explain and reflect direct experiences to connect theory and practice for better understanding (Cattaneo, 2019). In these self-generated GoPro videos, students view their own work performance, create content and engage in reflection through video replay, which in turn allows for a greater understanding of their skills. Supervisors can also view and access these videos as they connect with the work of students from different companies. As a current workplace issue is accessibility to the practice setting of students (de Bruijn & Leeman, 2011; Virtanen & Tynjala, 2008), video recording could be a viable way to monitor and assess several people in many places to facilitate knowledge sharing and feedback.

However, to effectively use an action camera for training and learning purposes, understanding firstly students' attitudes is required. Following the how and why individuals accept new technology may lead to predictive behavior of actual use in the future and a starting point for designing successful implementation. The relationships between people and technology is complex, thus technology acceptance research speculates that a user's acceptance and perception of a technology is driven more by attitudes and behavior than by features of it (Chang & Yang, 2013; Jang & Noh, 2011; Venkatesh & Davis, 1996). Therefore, this research aims at exploring the factors that lead to students' adoption of an action camera such as GoPro in a VET setting. An adapted model of the unified theory of acceptance and use of technology (UTAUT) will be used and includes the moderating variables of age and technology literacy. The remainder of the paper is as follows. First, the background of the paper is presented; then the theoretical framework, followed by the hypotheses development. Next, a section dedicated to research methodology is discussed, with sections presenting and discussing the results and the theoretical and practical implications. Lastly, a concluding section with limitations and suggestions for future research is outlined,

Vocational Knowledge in a Dual-Learning Environment

Vocational knowledge in a dual-learning environment requires integration of several types of knowledge that contribute to professional expertise, namely, *theoretical, practical, self-regulative, and socio-cultural knowledge* (Bereiter, 2002; Tynjälä, 2008; Tynjälä, 2009). Theoretical knowledge is taught in the school learning environment and is defined as explicit, conceptual and formal in nature (Schwendimann et al., 2015). Work-based learning aims to develop practical knowledge which is experiential, implicit and embedded in practical skills (Tynjälä et al., 2016). This dual-learning context thus offers opportunities for students to apply their knowledge in VET requiring integration of what they have learned and experienced in different situations to become professionals (Billett, 2014). Billett (2003) suggests this is a key foundation of rich learning in vocational education. Further, the third element of professional knowledge is self-regulative knowledge, or metacognition and reflection, which requires a learner to be consciously reflective in their theoretical and practical learning activities. Theoretical, practical and self-regulative knowledge are forms of personal knowledge whereas socio-cultural knowledge is gained through social practices and communities that use tools and artefacts in specific ways. Despite the acknowledgement of these important elements needed at work, there is little attention being paid by educational programmes to these context-specific forms of knowledge (Tynjälä, 2009).

Besides developing certain types of knowledge in VET, there are two learning pathways, a school-based and work-based pathway that involves an apprenticeship. Both pathways involve school and workplace learning but in different proportions. Students who spend four days a week at the work site and one day a week at school follow a work-based learning track and are employed under rule to a company while studying part-time. A greater learner gap is present in a work-based learning path for several reasons. Onstenk (2009) shares how Dutch regional VET colleges are less interested in promoting work-based courses and more so in increasing the practical learning in companies and simulated environments from a school-based pathway. To add, there is more financial support to colleges for a school-based trajectory, as there have been structural changes in the Dutch economy and educational policies generally favoring school-based education (Onstenk, 2009). Thus, the seeming absence of school learning at the workplace places a lower value on practical learning to students on a work-based learning track. In the following section, common challenges that are facing students, teachers and supervisors in a VET dual-track system are presented.

Challenges

Currently, discussions on Dutch VET programs have been about efforts to improve the quality of workplace learning as well as the quality of the connections between the workplace and school. In fact, research has shown that the quality of workplace learning in regard to content, guidance and assessment is not guaranteed for teachers, students and practical work supervisors (Onstenk, 2009). Teachers, who are responsible for helping students with their requisite knowledge and skill development, guide and monitor their progress at a distance with little communication and interaction with the supervisors. Often teachers are uninformed about vocational practice to help students identify the link between school and work (Onstenk, 2009). This results in a lack of information, misalignment of preparation for work practice and school assignments, and inadequate connection of theory and practice (Blokhuis et al., 2002; de Bruijn

& Leeman, 2011; Virtanen & Tynjala, 2008). And while the school environment offers a dedicated learning space for mistakes, reflection, and theoretical understanding, not all school climates are open, encouraging and available for discussion and analysis of incorrect behaviors due to economic consequences for work (Cattaneo & Boldrini, 2017).

Supervisors are often not trained to provide high-quality interactions and are unavailable to participate in the daily work processes of students (Onstenk, 2009). Often they are on a timely schedule to finish projects and have several students from different companies in various locations (Kilbrink et al., 2018, Schwendimann et al., 2018). Similarly, because supervisors are unaware of their own guidance practices and the subjects taught at school, it becomes difficult to describe the results of the learning to students who experience learning in fixed daily routines with little time for reflection (Onstenk, 2009). This results in students becoming unaware of the learning processes at work. The time for learning, reflecting, feedback and supervision is limited because the main purpose of industry workplaces can be seen as profit-driven (Billett, 2014). Consequently, VET misses a way to connect the goals of mastering work efficiency through supervision and motivating students for theory which is done through resituating knowledge and skills in new contexts (Onstenk, 2009).

Moreover, student apprentices face restrictive issues in attempting to connect workplace and school learning. Often in lower level training programmes, students find that they have to adjust their knowledge, skills and attitudes to engage in tasks the way the workplace wants them to (Onstenk, 2009). Narrow job training, no organizational structure in place to progress and gain new skills, and little access to a knowledge base are prevalent (Fuller & Unwin, 2003) and lead to unclear relationships between work experience and the study environment (Onstenk, 2009). Additionally, because the workplace-based learning environment emphasizes development of professional identity, many student novices refer to themselves as being more “hands-on” as opposed to academic learners. Student’s preference toward the former identity leads to a critical view of being “classroom” learners (Brockman, 2010). Already, there is reluctance to engage with the academic activities at the school. Students struggle with the writing process needed to complete portfolios or reports, and many are not used to reflection writing in general (Schwendimann et al., 2018). Even the literacy skills of vocational learners in the Netherlands is below average in some study fields (Christoffels & Kans, 2015). These experienced difficulties indeed require high-level cognitive and critical reflection skills, making integration of knowledge burdensome (Baartman & de Bruijn, 2011). Overall, there are various factors that are present in the challenges of a work-based learning environment for students, teachers, supervisors and educationalists.

Integrative Pedagogy and Connectivity in Work-Based Learning

In response to the need for VET learning to happen simultaneously in two different learning environments, several theories and models have been proposed to address this separation. The principle of integrative pedagogy has a starting point in constructing these learning environments with its basis in the elements of professional expertise (Eraut, 2004; Tynjälä, 2016) previously outlined. The idea behind integrative pedagogy suggests that theoretical and practical knowledge must interact to reach high levels of expertise, but also required is integration of these elements to develop expertise (Guile and Griffiths, 2001). Traditionally in VET education, theoretical studies and work practice have been taught separately with little obvious connection between the two which is where integrative pedagogical practices emphasize wholeness (Tynjälä et al., 2016). Thus, theory, practice and self-regulative knowledge are linked together through reflection processes from learners' experiences where mediating tools are then needed to connect the different knowledge forms. These include any activities students use to distinguish theoretical concepts in practice such as discussions, written reflections or tutoring (Schwendimann et al., 2015; Stenström & Tynjälä, 2009).

Further, Guile and Griffiths (2001) analyzed several models involving the learning relationships occurring between school and work. They proposed that the connective model of work experience is an ideal model that supports the integration of knowledge and thus approaches an integrative pedagogy that develops expertise. The concept of connectivity, or the bridging of things that have been separated, has its role both in promoting the integration of learning and work and supporting the essential collaboration between students, teachers and supervisors (Stenström & Tynjälä, 2009). It concerns connecting people and involves integration of the different knowledge forms used in education and work. This model emphasizes the repositioning of learning, or the ability to resituate existing knowledge and skill in new contexts. Students reflect on their formal conceptual learning by working collaboratively to develop connective skills which facilitates being able to work in new and changing contexts. So, the connective model can be seen as a framework for approaching an integrative pedagogy where the development of vocational and professional competencies integrate theory and practice (Stenström & Tynjälä, 2009).

The 'Erfahrraum' Model as an Integrative Design

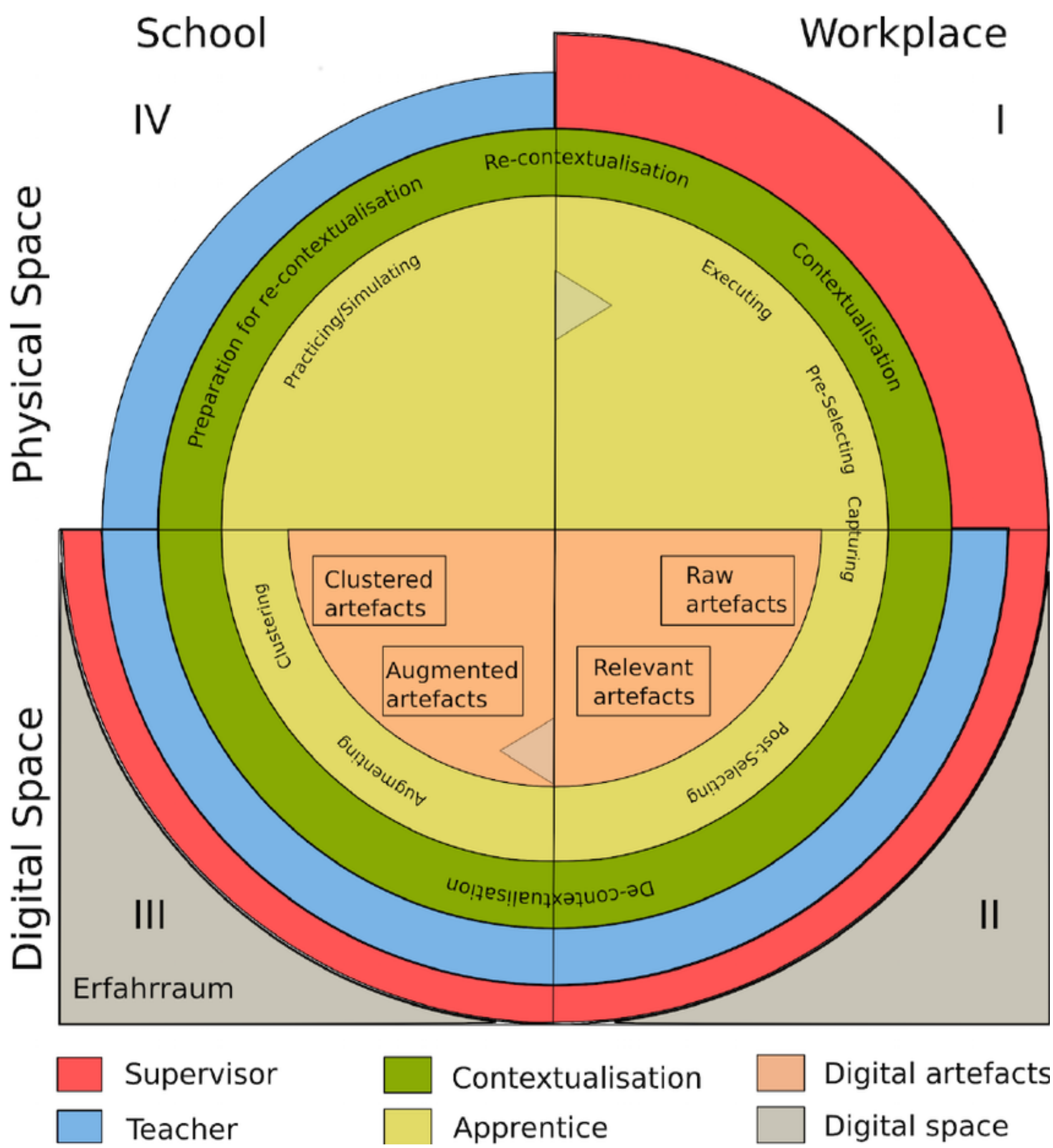
To support integrative and connective learning, there is evidence that applying technology-enhanced learning activities would be a way to improve the VET gap (Hämäläinen & Cattaneo, 2015). More specifically, the 'Erfahrraum' Model by Schwendimann et al. (2015) premises that learning technologies can potentially bridge the gap between the dual systems. There is a reflective digital space that is created by technologies where knowledge is moved forward and backward between contexts and is reflected upon and shared with different actors. In fact, the German term ‘Erfahrraum’ is referred to in two words as ‘Raum’ meaning a type of physical, digital or cognitive space for learning, and ‘Erfahrung’ or reflected experience. Together the words suggest that knowledge needs to be constructed through reflection and that experience alone does not achieve this (Schwendimann et al., 2015).

The Erfahrraum cycle has four main phases creating a circular iterative model (see Figure 1) that distinguishes school and work. Quadrant I represents students' experiences in the working context. Supervisors oversee the production-oriented focus of students' actions here and generally there is little room for reflection. However, with the help of digital technologies, students can pre-select and capture digital artefacts in the form of pictures, videos, or audio recordings. Students can use these self-selected experiences to be documented, shared and processed in the future. The documentation of these experiences in the Erfahrraum allows connections between people across contexts as well as acting as a form of reflection for students in remembering and externalizing. An artifact is then stored in a student's personal space (Schwendimann et al., 2015).

Quadrant II is considered a post-selective stage where students learn what artifacts are VET-relevant in order to benefit meta-cognitively from their experiences. In Quadrant III, the selected experiences go through organization and processing. The aim of processing includes eliciting experiences, decontextualizing them, and integrating the different knowledge forms associated with VET. In this phase, teachers can scaffold reflection activities for students to interpret their workplace experiences. Processing involves augmenting digital artifacts through commenting or tagging theoretical concepts. Another sub-process includes clustering used for comparing and contrasting artifact cases to form mental “clusters” to aid in expertise development. Both of these sub-processes help to construct de-contextualized knowledge. Lastly Quadrant IV focuses on the re-contextualization of knowledge into the workplace. Teachers can provide opportunities for students to apply their knowledge through practice exercises in order to create sense-making in the situations at the workplace. Overall the Erfahrraum cycle is a model of systematic reflection and uses workplace experiences to create integrated VET-relevant knowledge. It works to support the instructional design of implementing technology-enhanced learning in VET (Schwendimann et al., 2015).

Figure 1.

The 'Erfahrraum' Model by Schwendimann et al. (2015)



Video Usage for Training and Learning

One approach to implement the Erfahrraum to capture student experiences that foster connective and integrative learning is through the use of video. In particular, an action camera could be offered as a simple and engaging technology to promote students' experiential learning through the capturing of the professional setting. Students can be shown a hypothetical demonstration on how to use GoPro action cameras to capture their work experiences. This captured authentic work experience to reference and analyze is an important principle for an instructional design strategy (Cattaneo & Boldrini, 2017). Students can be shown how they will be able to record and explain their actions through commentary and annotations by wearing the cameras as head mounted GoPro’s which provides a hands-free first-person point of view. Video recording and annotation have been shown to be helpful to learning as context-based notes can be added directly to them (Cattaneo & Boldrini, 2017). Then, students can learn how to upload their material so that they can reflect on their practices with themselves, their teachers at the school place, and their supervisors at the worksite. This shared conversational learning space is approached by Sharples et al. (2007) as a process that individual learners and communities of learners use to make sense of the exploited material collected on the move. So in including a quality instructional design based on prevalent learning theories, the methodology and application of using GoPro can influence successful implementation and acceptance for effective learning.

There are several advantages for students in filming their own performance. Firstly, learners are granted autonomy and self-regulation when they can control and produce videos through GoPro. Video-use can help learners to independently learn declarative and procedural knowledge in VET by viewing at their own pace, self-regulating information, and being able to use video playback (Cattaneo et al., 2019). In fact, several studies have documented ways video recordings have helped students in practice-based learning. In McKinley et al. (2019) study, the use of head-mounted GoPro's for surgical education supported the improvement of students' procedural skills. Another study found that using GoPro for video reports had improved the technical communication skills of students instead of a written report (McCaslin & Young, 2015). Similarly, Donkor (2010) found that the use of video-based instructional materials for brick-laying had superior craftsmanship outcomes than to users of print-based materials. Also, more reflection activities took place after comparing students who engaged in video-based versus paper-based reflections for performance (Ratumbuisang et al., 2018).

Action cameras also provide several affordances from a technical perspective. For one they display portability which is defined as being easily carried around and moved. Action cameras also have a small screen size for viewing content easily. To add, they are described as having connectivity which is being able to transfer information easily between people (social interactivity) and places, or availability anywhere anytime. Action cameras are context sensitive which means accessing content that is adapted to the situation or task. Other affordances include ownership, or being accountable for one's learning, multimedia convergence, and location awareness to name a few (Cattaneo et al., 2015). A main affordance suggested by Lai et al. (2007) is the rapid access interface for sound and video-recording. Action cameras are sturdy, resilient and allow a first-person view of a setting which is a suitable practice for vocational learners on the move in multiple locations. Mobile technologies such as an action camera can be set up to move with learners across space and time, allowing an individualized relationship as well as a social one that is shared with other learners and people (Motta et al., 2013). According to Passey (2010), two significant activities are possible with a mobile technology such as an action camera- the capturing of the ideas when and where they are generated and the sharing of the captured work settings with more experienced people that then promotes conversation and discussion. Thus, an action camera can be seen as a mobile device that allows students to capture their professional workplace experiences and procedures to be reused in the school learning location.

Video Technology Acceptance in a VET Context

A shift in the literature has begun to focus on individuals as the main subject during the implementation of new technology versus the focus of technology alone. Individuals move and engage across space and time with technology, making learners mobile rather than technology itself (Motta et al., 2013). This research looks at the interaction between people and technology and its relation to adoption. According to UTAUT research, individual technology acceptance has been studied across different user types, technologies and settings with repeated confirmation of the generalizability of the model and its main effects. In this study, we investigate if students in VET will be influenced to use an action camera such as GoPro in the future. The study presented in the current paper is part of a larger project whose aim is to bridge the gap between learning at the school and the workplace using technologies and teaching methods. Although such devices such as an action camera has the potential to be a bridge connector, it is unclear if they are suitable in a VET setting and can be accepted at the worksite as learning tools, and whether the capturing of the professional experiences will be seen by the different stakeholders as beneficial to students vocational expertise development.

Using the UTAUT model, we expect that three constructs will be significant direct determinants of intention to use: *performance expectancy, effort expectancy, and social influence* as these constructs have frequently confirmed individual's acceptance of a technology.

Additionally, moderator variables such as age and technology literacy have been included in acceptance studies and have confirmed strong evidence of their effects (Bandyopadhyay & Fraccastoro, 2007; Durak, 2019; Venkatesh et al., 2003). These moderators are significant because age has been shown to affect individuals' acceptance of technology along with technology literacy skills. In this study, there are several age groups in our context from young to old that may have an effect on their digital skills and thus their willingness to accept an action camera technology for learning.

Performance Expectancy

Performance expectancy is the degree to which an individual believes that using a technology will help them in their professional performance (Durak, 2019). In this study’s setting, it is the students' belief that using GoPro will improve their work performance. They are more likely to use GoPro if they are assured it will bring satisfactory results and benefits. Performance expectancy has been found to be the strongest predictor of intention in the original Venkatesh et al. (2003) model. Further, the effect of performance expectancy on intention to use has been positively supported in various studies using video-related technology (Lakhal et al., 2013; Tsung-Yu et al., 2020).

Therefore it is expected that:

H1: Performance expectancy will positively affect behavioral intention to use GoPro.

Effort Expectancy

Effort expectancy is the degree of ease associated with an individual's use of technology. Effort expectancy has also been shown to be a significant predictor on behavioral intention (Chang et al., 2007; Puriwat & Tripopsakul, 2021; Tosuntaş & Orhan, 2015; Wang & Shih, 2009). Rawashdeh (2015) found that perceived ease of use on e-learning adoption had significantly influenced individuals' intentions. It is likely that students' perceived degree of ease in using GoPro will affect their behavioral intention to adopt if it is easy to use. Based on this assumption and UTAUT's hypotheses, it is expected that:

H2: Effort expectancy has a significant positive effect on an individual's behavioral intention to use GoPro.

Social Influence

Venkatesh et al. (2003) explain social influence as the degree to which a student perceives that important people around them believe they should use the technology. The notion of social impact states that students are influenced by the belief of how others will view them when they use GoPro. The effect of this construct on the intention to use has been significant in several acceptance studies (Ayaz & Yanartaş, 2020; Hoque & Sorwar, 2017; Pan & Gao, 2021; Wang et al., 2009). It is plausible then that students are influenced by colleagues, teachers and supervisors that would determine their usage of an action camera. The hypothesis is stated as:

H3: Social influence is positively related to students' behavioral intention to use and accept GoPro.

Moderators

Age has consistently been found as a significant moderator in UTAUT studies by Venkatesh et al. (2003) in which it moderates the relationship between the independent and dependent variables. For performance expectancy, it was found that younger adults were more affected than older adults by this construct (Venkatesh et al., 2012). Also, some studies looking at computer use found that the older the adult, the less interest they had in using a computer

(Billipp, 2001; White & Weatherall, 2000). Tacken et al. (2005) suggest this decline may be due to a biological shift in cognitive ability of older adults. Performance expectancy was found to have a stronger effect on younger participants while effort expectancy and social influence were found to have an effect on older adults (Venkatesh and Morris, 2000; Venkatesh et al., 2003). Wong et al. (2012) put forward that younger and older users have different orientations to needs, interests, and goals. With regard to these differences, it can be assumed that it may lead to differences in accepting technology such as an action camera for learning. To add, most studies using age as a moderator have focused on youth and middle age adults (40 and under), with little studies focusing on adults over 50 in online usage (Lian & Yen, 2014). In the VET environment, there are different age groups ranging in this population, such as young adults primarily beginning at age 16 and older adults up to 50. Onstenk (2009) shares how the average age of apprentices is actually rising. Therefore, it will be interesting to focus on the differences between age groups, if any.

The following hypothesis is then inferred as:

H4: The influence of performance expectancy, effort expectancy and social influence on students' behavioral intention to accept GoPro will be moderated by age. Performance expectancy will have a stronger effect on younger students, and for older students we expect that the effects of effort expectancy and social influence will be amplified.

Technology literacy has come to grow into multiple definitions. Some of these definitions are grouped under information literacy, computer literacy, digital literacy and Internet literacy and can be understood under one general term, namely “technology literacy” (Coklar & Sahin, 2014). In this study, technology literacy is conceptualized as being able to perform fundamental tasks on a computer and digital communication devices such as a smartphone. Included in this are having general web skills, using communicative tools such as e-mail, and being able to interact with a camera and PC. In general, technology literacy is based on an individual's previous experience with technology (Callum & Jeffrey, 2013) and several studies have highlighted the positive relationship between a user's past experience and the adoption of a new technology (Hasan, 2003; Potosky, 2002). Currently there are no other studies about technology literacy levels in this population.

Nonetheless, technology literacy is described as having confidence to use, understand and apply technology knowledge and skills (Embi, 2007). Research has shown how users that are highly confident in judging their capabilities to use technology are more likely to use it and find they will be successful in the application, while those with lower levels of confidence are less willing and believe that technology is hard to use (Cázares, 2010). Similarly, Callum et al. (2014) found that even having just a basic level of ICT literacy skills influenced the future adoption of a new technology. Thus, in this study it is expected that technologically literate students will accept and use an action camera more strongly.

The following hypothesis is then inferred as:

H5: The influence of performance expectancy, effort expectancy and social influence on students' behavioral intention to accept an action camera will be moderated by technology literacy. It is expected that students with high technology literacy will find it easier to perform well with a new technology, and use little effort to grasp new technology. For social influence, it is expected that those with limited experience will be influenced to use a new technology if they see others benefiting from it, which in turn affects their acceptance levels.

To this end, the following research question in the study is: *To what extent do performance expectancy, effort expectancy, and social influence affect VET students' intention to use GoPro as moderated by age and technology literacy?*

Method

Participants & Design

This study uses cross-sectional survey data to analyze descriptive empirical research. It adopts a quantitative research design using the UTAUT model as a theoretical framework. The dependent variable is measured as behavioral intention to use GoPro and the independent variables include performance expectancy, effort expectancy and social influence. Forty-four out of sixty-nine participants completed a digital survey consisting of 44 questions. The majority of respondents were male students (n=42, 95.5%), while 4.5% were female (n=2). The students that participated in the study have an age between 17 and 52. The average age was 32 years (M=32.07, SD= 9.06). Participants were enrolled as technicians in gas, water, heat and electricity distribution or double degree programmes.

Context of the Study

This research focuses on a Dutch secondary technical vocational education, or Mbo, where participation is mainly from people aged 16 and older. Students are trained for specialized occupations and complete programme training in 2-4 years. There are four levels within a programme. Level 1 is considered an entrance course and the most practical, while Level 4 is known as being the most theoretical and qualifies one for work and higher professional education (Onstenk, 2017). In this study, participants were enrolled as underground infrastructure technicians in intermediate Level 2 and 3 of Mbo following a work-based or dual-learning track.

In this VET programme, students are prepared to work with electrical tools, underground wires, cables, and other equipment. Students practice four days a week for a company as apprentices and study one day a week at school. When students are in the school environment, they follow classroom lessons on the specific occupational subjects for infrastructure and practice under simulated conditions. Tests and assessments are used to measure their theoretical knowledge and their practice-based skills. Supervisors assess students based on an extensive list of skills that have been met sufficiently or not.

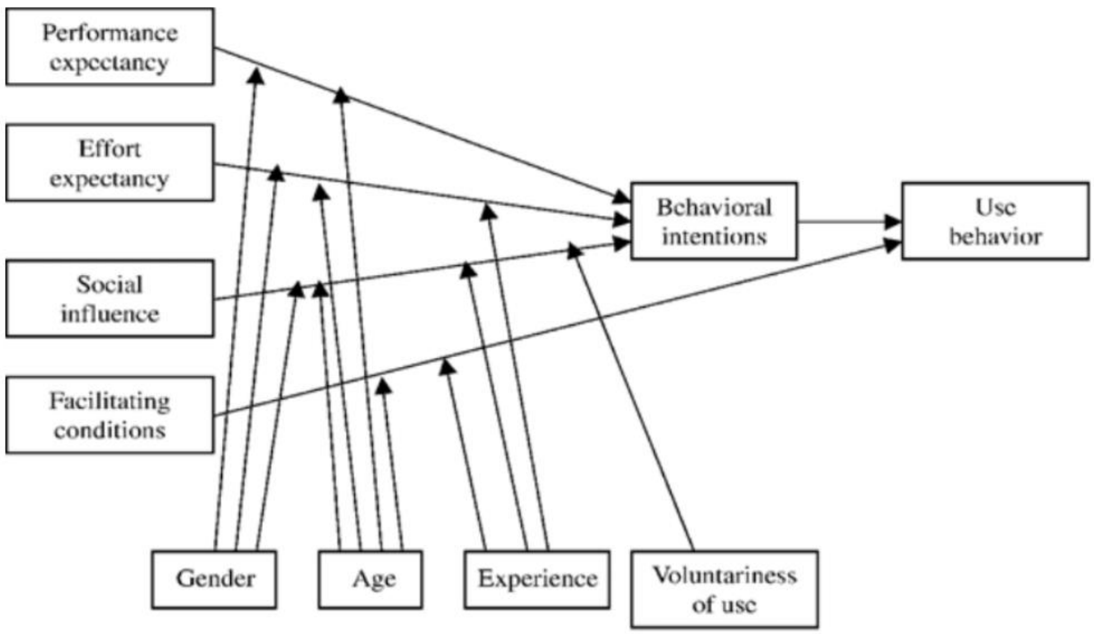
Instrumentation

Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The basic framework used in this study is a technology acceptance model (Figure 2) developed by Venkatesh et al. (2003). Included in this model are four main determinants that are hypothesized to relate to the intention to use and usage behavior of a new technology. There are four moderating variables as well that generally suggest a relationship between the main constructs. UTAUT has a reliable explanatory power that explains about 70 percent of variance in behavioral intention to use and accept a new technology, which is unlike other models that have been known to explain around 40 percent (Wu, Tao & Yang, 2007; Venkatesh et al., 2003). The model has been used to study a broad field of technologies (Williams et al., 2011) with a number of quantitative studies considering the acceptance of digital and online learning (Durak, 2019; Hu et al., 2020; Maldonado et al., 2011; Tan, 2013; Tey & Moses, 2018). Therefore, it can be argued that the UTAUT is a sound theoretical basis for the study.

Figure 2.

Original UTAUT Model by Venkatesh et al. (2003)

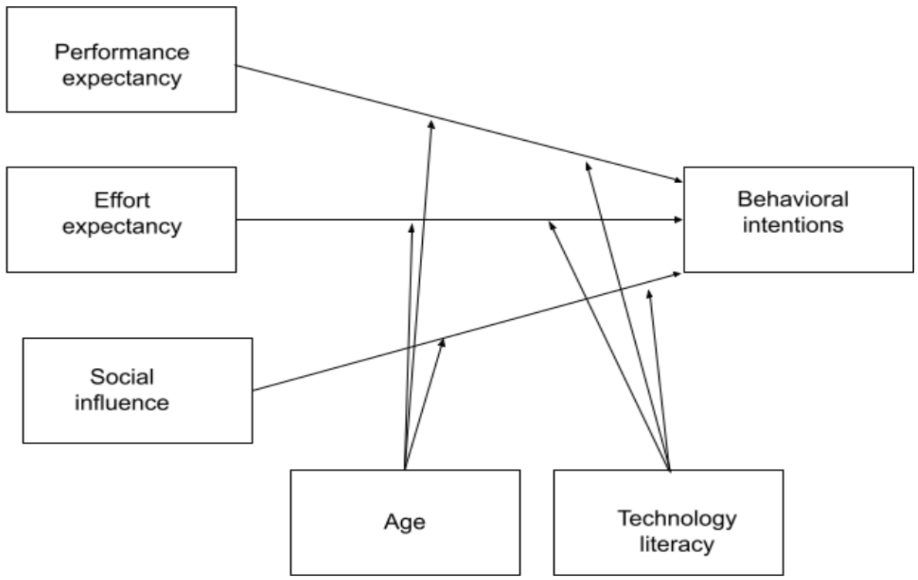


Adaptation

This research adapts the UTAUT model (Figure 3) to study factors that predict an individual's intention to use an action camera in VET in the Netherlands. The first adaptation was in dropping the measure of UTAUT's user behavior construct. This construct measures individuals' usage after they are introduced to a technology. Time and resources would be needed to determine behavioral use and currently the VET schools are not at the action camera implementation stage. Rather, the purpose of this research is investigating the intention to use before using. A large body of literature shows there is a strong correlation between intention to use and actual usage behavior (Venkatesh et al., 2003). Thus, the first step in preparing to integrate video technology is understanding the variables that influence students' intention and willingness to use before their experience with the technology. In line with this, the facilitating conditions construct will be dropped because it is defined as a consumers' perceptions of the resources and support available to facilitate them during usage. Additionally, the original moderator variables in the UTAUT have frequently been changed in the literature (Williams et al., 2011), so it is presumed that exploring the role of age and existing technological skills would be useful for observing adoption intentions. In the future it may be that action cameras will be a mandatory application rather than a voluntary option in VET, so the original voluntariness of use moderator will not be included. Gender will not be included because the majority of students in the field are males. Experience will also be removed because it refers to an individual's use with the technology over a period of time (Venkatesh et al., 2003) and rather we are looking for individual behavior and motivation before using a new technology.

Figure 3.

Conceptual UTAUT Model adapted to the context of GoPro use in VET



Survey Instrument

The survey instrument was developed by Venkatesh et al. (2003) and was adapted by the researcher to fit the context of the study. The survey questionnaire includes questions about the UTAUT constructs, demographic characteristics, and technology literacy skills to determine VET students' perceptions of their intention to use an action camera. The questionnaire has a Likert-scale corresponding to “totally disagree” (1) to “totally agree” (5) for all latent construct items and technology literacy skills. Table 1 provides an overview of the UTAUT items located in Appendix A.

The technology literacy scale was devised by the researchers to match the context of the study as several instruments were developed previously but none focused on technology literacy for PC and camera skills. The scale was based on Misirli and Akbulut (2013) study of technology literacy skills. However, we decided to focus more on technology proficiency as we wanted to determine how capable students were in engaging with a GoPro task and the technological skills needed to perform it. So, we used several examples in their study that measured the concept of technology proficiency and tailored them to the context of our study. The result of our scale is based on a five-point Likert system consisting of 13 items and four dimensions. The first dimension is called "Camera and PC Interaction" and was assessed with three items, for example, '*I can connect cameras and USB sticks to the computer'*. The criteria used to select this section was to determine what level, if any, students had with basic camera skills since it is expected that students will be editing, storing and sharing videos on a platform that involves connecting a GoPro to a PC. Thus, students will be expanding their digital literacy through video publishing and editing. The second section, "Web Browser Capabilities", was assessed with three items, for example, '*I know how to look things up on the internet'*. The "Communicative Applications Usage" section was assessed with three items, for example, '*I can use email'*. Lastly, "Smartphone Usage" was assessed with four items, for example, '*I can send photos and videos with my mobile phone'*. A complete overview of the items are located in Table 2 under Appendix B.

Procedure

Quantitative data was collected from the results of the survey that was sent out at the various Mbo schools. Approximately twenty-four partners were involved in the project. Firstly, survey information on how results would be obtained was provided to participants which included the importance of participation and anonymity. Then, demographic information was collected such as gender, age and study programme. Proceeding this, participants were shown a hypothetical demonstration in the form of a video on how to use GoPro action cameras to capture their work experiences at the worksite titled, “Training with GoPro”. The video was under two minutes and outlined the use of GoPro during training in the context of working as infrastructure technicians. We drew on Merrill’s (2002) instructional design principles to create a quality instructional design video where the methodology and application of using GoPro aimed to show ease and engagement for effective learning. Task instruction, activation of their existing knowledge, demonstration of content with examples and relevant media, application to the practice activity to a different context, and presentation of the integration of the new knowledge by sharing and reflecting to others were considered in the making of the video.

More specifically, the first several steps suggested students choose an assignment, read the instructions, gather materials, attach the helmet with GoPro, turn on camera to film, and check the video. Afterwards, filming the assignment, connecting the camera to a computer, and uploading the video was shown. Lastly, students were presented the opportunity to edit, mark and annotate the videos while reviewing the assignment to finish. Lastly, participants were prompted to answer the main construct questions in relation to viewing the video. Surveys were collected using Qualtrics and translated to English. Rewards were offered for participation in the form of randomized 10 euro gift card giveaways.

Data Analysis

The survey data was entered into the Statistical Package for the Social Science (SPSS) and proceeded in two stages. Firstly, descriptive statistics was conducted for all variables including students demographic information such as age, gender, and study type. Frequencies and percentages were used for the nominal variables study type and gender. Means and standard deviations were used for the variables for age, UTAUT constructs and technology literacy scale. The next stage of analysis included a Confirmatory Factor Analysis (CFA) with oblique rotation, and was used for the UTAUT constructs and technology literacy scale. To test the consistency and reliability of the UTAUT and technology literacy data, Cronbachs alpha (α=.70) was run as a boundary value for the instruments as a whole. A multiple linear regression analysis was performed using the UTAUT subscales and the moderator variables age and technology literacy scale against the dependent variable behavioral intention to use. To test the interaction terms between the independent variables and moderators, centering their means to 0 was created for each continuous variable and then multiplied together to determine statistically significant interactions. This helps to reduce multicollinearity and makes the results easier to interpret.

Results

The descriptive statistics for the participant’s demographic information is presented in Table 3. The average age of participants was 32 years old (*SD*=9.06). The youngest participant had an age of 17 with the oldest being 52 years.

Table 3

Respondents Demographic Table (N=44)

Measure	Item	Frequency	Percentage
Gender	Male	42	95.5%
	Female	2	4.5%
Study	Mechanic Gas Water and Heat Distribution	11	25%
	1st Mechanic Gas Water & Heat Distribution	9	20.5%
	Low Voltage Distribution Technician	5	11.4%
	1st Low Voltage Distribution Technician	5	11.4%
	Mechanic Medium Voltage Distribution	1	2.3%
	1st Mechanic Medium Voltage Distribution	1	2.3%
	Double Degree: Mechanic Gas, Water and Heat Distribution; 1st Mechanic Gas, Water and Heat Distribution	3	6.8%
	Other	9	20.5%

Student participants responded to the *UTAUT Questionnaire*. The descriptive statistics for the four subscales (performance expectancy, effort expectancy, social influence, behavioral intention) are shown in Table 4 together with the mean scores of each. Although not presented, the theoretical minimum and maximum values were 1 and 5 given that the mean (*M*) score of the scale averaged around 3.

Table 4

Descriptive Statistics for Technology Literacy Scale

Subscale	n	M	SD
Performance Expectancy	44	2.99	.744
Effort Expectancy	44	3.11	.415
Social Influence	44	3.21	.518
Behavioral Intention	44	3.29	1.18

Table 5 shows the descriptive data concerning the scores gathered by students from the technology literacy scale: Camera and PC Interaction (CPC), Web Browser Capabilities (WBC), Communicative Applications Usage (CAU), and Smartphone Usage (SMU).

Table 5

Descriptive Statistics for Technology Literacy Scale

Subscale	n	M	SD
CPC	43	4.36	.680
WBC	43	4.32	.636
CAU	43	4.50	.583
SMU	43	4.61	.535

The reliability coefficients of the UTAUT subscales are listed in Table 6. Cronbachs was acceptable (alpha .70 or higher) for performance expectancy (.76) and behavioral intention (.90). Effort expectancy and social influence had relatively lower levels of reliability, although the entire instrument was run at Cronbach's alpha of .70 giving an acceptable reliability level in general.

Table 6

Reliability Analysis

UTAUT Construct	Cronbach's Alpha	Number of Items
Performance Expectancy	.76	4
Effort Expectancy	.61	4
Social Influence	.58	3
Behavioral Intention	.90	2

All four dimensions of the technology literacy scale in Table 7 showed acceptable levels of internal consistency reliability with Cronbach's =.70 or higher.

Table 7

Reliability Analysis

Technology Literacy Item	Cronbach's Alpha	Number of Items
Camera and PC Interaction	.87	3
Web Browser Capabilities	.73	3
Communicative Applications Usage	.95	3
Smartphone Usage	.99	4

A confirmatory factor analysis (CFA) was used to verify the UTAUT and technology literacy variables factor structure. CFA confirms the hypothesized number of constructs and the relationship between the constructs and the items, given the researchers previously established understanding of that construct. For the UTAUT constructs, eleven variables were used to measure three factors. The UTAUT instrument was altered during the final factor analysis loadings. Performance expectancy had several items added to its construct, while effort expectancy decreased to three items and social influence to two items. The total explained variance was 51.31%. For the exact factor loadings of each item see Table 8 in Appendix C.

For the technology literacy subscales, nine variables were used to measure three factors. The instrument was also altered after loadings were revealed. Smartphone usage was omitted while communicative applications usage was reduced to merely one item. The total variance was 86.7%. The exact factor loadings for these items are located in Table 9 under Appendix D.

A Pearson correlation was run to determine the strength of the linear relationship between the constructs. There is a significant correlation between behavioral intention and performance expectancy (r=.61). Behavioral intention and social influence also had a significant correlation (r=.53). However, behavioral intention and effort expectancy did not significantly correlate (r=.25). See Table 10 for the results.

Table 10

Pearson's Correlation Coefficients

Measure	1.	2.	3.	4.	5.	6.
1. Age						
2. Technology literacy	-.27					
3. Behavioral intention	-.16	.28*				
4. Performance expectancy	-.06	.27*	.61*			
5. Effort expectancy	-.14	.63*	.25	.42*		
6. Social influence	.06*	.06*	.53*	.38*	.08*	

*p<.05

To determine whether the UTAUT predictors have an influence on behavioral intention, a multiple linear regression was conducted. The multiple linear regression analysis revealed that the overall model was significant, R^2 = .45, F (3, 39) = 12.35, p = <.001. Investigation of the parameters revealed that performance expectancy positively impacted behavioral intention, b = .29, p = <.001. Social influence did not have a significant influence on behavioral intention, b =.51, p = 007. Effort expectancy also did not have a significant influence on the dependent variable, b = .01, p = .89. Results are listed in Table 11.

Table 11

Results of the Multiple Regression Analysis

Predictor	*b*	*SE*	β	*t*	*p*
Performance expectancy	.29	.08	.47	3.4	.00
Effort expectancy	.01	.14	.01	.13	.89
Social influence	.51	.18	.35	2.8	.007

R^2 = .45, F (3, 39) = 12.35, p = <.001

A number of moderated regression models were run to test for the potential moderating effects of age and technology literacy skills between performance expectancy, effort expectancy and social influence on behavioral intention. Age did not moderate the relationship between performance expectancy, effort expectancy and social influence on behavioral intentions. Results for this interaction effect were not included hereafter. Technology literacy skills showed a statistically significant interaction between performance expectancy (p<.05). But, neither effort expectancy nor social influence were moderated by technology literacy skills. General testing for the interaction effects was done by multiplication of the independent variables with the moderators after centering continuous variables to have a mean of 0. So, the centered moderator variable for technology literacy was multiplied with the centered variable for performance expectancy. The significant results from the model are listed in Table 12.

Table 12

Moderated Performance Expectancy Regression Model Results

Model	*b*	*SE*	*β*	*t*	*p*
(Constant)	6.3	.30		20.9	<.001
Technology literacy centered	.07	.06	.15	1.2	.22
PE centered	.24	.09	.40	2.7	.01
Technology literacy centered*PE centered	.04	.01	.31	2.2	.03*

*p<.05

Discussion and Conclusion

The aim of this study was to investigate whether the main constructs in the UTAUT model would predict the behavioral intention to use GoPro by vocational students as moderated by age and technology literacy skills. The present research focused on the question: "*To what extent do performance expectancy, effort expectancy, and social influence affect VET students' intention to use GoPro as moderated by age and technology literacy?"*

Firstly, the study confirmed that performance expectancy would have a positive effect on behavioral intention to use GoPro. Studies in the literature support this (Attuquayefio & Addo, 2014; Durak, 2019) and have shown that performance expectancy is the strongest predictor of behavioral intention (Venkatesh et al., 2003; Wang et al., 2008). In this study, students felt that using GoPro would improve their performance in the workplace. Given that the work pace is intense and the work location is constrained, students may expect to need video technology in their work. Students' behavioral intent, or the likelihood of using a new technology, was influenced by their beliefs regarding whether the use of GoPro would enhance their work learning performance.

Next, it was predicted that effort expectancy would have a positive effect on the dependent variable. However, the study did not support this expectation. This stands in contrast to previous research that found perceived ease of use associated with an individual's behavioral intention to adopt (Kijsanayotin et al., 2009; Tan, 2013; Wang & Shih, 2009). The lack of support for this hypothesis may be due to the familiarity of students with the use of cameras and smartphones already. Students indicated that they felt they had the technology literacy skills to be able to use email, view photos from their phones and connect cameras to a computer. In line with this, it can be argued that smartphones, cameras and GoPro's share several characteristics including a small display screen to input data and button functionalities which would indicate familiarity. Furthermore, Venkatesh et al. (2003) suggest there is a stronger relationship between effort expectancy and behavioral intention when the individual has no experience about the use of a new technology. This may explain why students do not show an effort expectation because they are considered an experienced user. Therefore, in this current study the effect of effort expectancy on behavioral intention may play a larger role for nonusers with limited knowledge of a new technology. Additionally, in studies such as Puriwat and Tripopsakul (2021) and Tosuntaş and Orhan (2015), both found effort expectancy to be significant, but both had sample sizes of close to 200. For an acceptable Structural Equation Model (SEM) analysis, researchers suggest at least 150 participants are needed (Anderson & Gerbing, 1988). Our study had a maximum value of 44 participants with 13 observed variables for the UTAUT instrument and 13 for the technology literacy scale, so the minimum ideal sample size would be 26 x 5 = 130. The statistical power may have been lower due to our sample size and thus we were more likely to fail to reject the null hypothesis of effort expectancy and associated variables.

Thirdly, social influence was posited to be a significant predictor of behavioral intention. This hypothesis was not supported by the dissertation even though several other studies found a relationship between the two variables (Wang et al., 2008). A reason for this may be that the use of GoPro is not a mandatory application in VET and Venkatesh and Davis (2000) have argued that social influence was significant in required settings. This means students did not find that peers, colleagues and supervisors influenced their behavioral intent to use GoPro. Even though Pan and Geo (2021) found social influence to be a predictor of intention to use a new technology, their study was conducted in a healthcare setting where they found that nurses and doctors displayed a sort of herd behavior and mentality. Sun (2013) proposed that herd mentality leads to technology adoption. So this may be a reason as to why social influence did not become a significant antecedent for behavioral intention to adopt because students do not function independently in a different learning setting.

The moderator age was expected to have an interaction effect between the UTAUT constructs and behavioral intention to use GoPro. However, this study did not support this claim even though other studies have shown support for it (Magsamen-Conrad et al., 2015; Venkatesh & Morris, 2003). This could be due to the fact that the mean age of students is around 32, which is relatively young. Venkatesh et al. (2003) have argued that age effects are likely for older people. Therefore age as a moderator in this case may not be important between the independent and dependent variables.

Besides age, technology literacy did moderate the UTAUT constructs but only for performance expectancy. Durak (2019) found a similar result in his study where technology literacy skills interacted with performance expectancy. He described how an individual's prior effort to learn how to use and understand technology relates to the process of acceptance. He goes on to say how technology literacy skills can be accepted as another determinant of behavioral intention according to Davis and Venkatesh (2004). In Durak’s study, users scored average on the technology literacy skills and were prompted to answer questions such as the positive and negative impacts of technology before using, using a technological tool accurately, making a detailed research on the tools being used, and believing that new technologies exist to eliminate the negative impacts of technologies. Having this average prior experience with technology as constructed in Durak’s technology literacy scale can explain how an interaction effect was present with performance expectancy, where generally individuals form performance judgements by comparing what a technology is capable of doing in what users need to get done (Davis & Venkatesh, 2004). Possessing technological skills influenced the belief that a technology would enhance individual’s performance by forming usefulness judgements from prior knowledge and experience, contributing to a stronger behavioral intention to use in the future.

A reason for the other constructs to not be moderated by technology literacy could be due to the decision to reorganize the scales based on the CFA technique, where we pre-determined the factor structure and tested the hypotheses to see if they were true. Then, it was assumed that there was one common correlation between the new items. So in looking at performance expectancy which had several items added to its construct, it gave an opportunity to interpret a new meaning to its structure. For example, the items “My boss will want me to use a GoPro” and “My school will want me to use a GoPro” were added to performance expectancy from the social influence factor set. Perhaps from the perspectives of the students who already feel that the priority in workplace based learning is profit-driven and performance heavy, that they view their boss and school organization as solely one associated with their performance. One can certainly relate to the idea that often leaders and authoritative establishments are seen as more knowledgeable and know what's best to succeed. A reason these two items did not fit well into social influence could be that students do not work closely enough with their supervisors or school officials to have their opinions, views and experiences be important enough to influence their beliefs about using GoPro.

One item from effort expectancy, “I think GoPro takes alot of time” was loaded onto social influence with “At my work, they will be fine with me using GoPro”. It is possible that students felt that even though GoPro seems like it takes a lot of time to learn or use, that those around them will still approve of their use at work because work tasks generally take a long time to complete. However, all of these items underwent a backward translation from Dutch to English, and this could have affected the results with problematic wording, so drawing conclusions from this cluster warrants caution. Also, the scale may not be too reliable given that the social influence item was not similar to the original UTAUT questionnaire item. Having highly correlated items with no apparent reason or having to interpret the not-so-obvious results is subjective and is considered a weakness of a CFA analysis. Nonetheless, the strengths of the CFA analysis include being driven by strong theoretical grounding and bridging the gap between theory and observation. And so, this may be why technology literacy did not have a significant effect between effort expectancy and social influence on behavioral intentions because of these changes and interpretations in the instruments.

Theoretical and practical implications

Contributions of the study for research and practice are as follows. The study adds to the literature regarding adoption of video-based learning using the UTAUT model in VET settings. Most research has focused on online learning adoption in the general education sector and has not given much attention to adoption in a vocational setting. The research will fill an important gap once the literature is viewed and the few studies using the UTAUT and videos for training and learning are quantitatively acknowledged.

The practical implications include improving the acceptance and use of action cameras in this context which can contribute to higher quality of VET school and workplace connections using technology. Strategies to encourage adoption and acceptance could be possible interventions in the school and workplace using age so additional training could be set aside for those that have different needs and skills in technology. Efforts could also be in focusing on social factors, for example, working with teachers and supervisors to encourage them to use the system and be supportive toward students so that the whole organization is covered with a strong communication system. Additionally, this study's scientific contributions will support the methodologies in the application of the UTAUT model and the strength of the relationships between the independent and dependent constructs. These research components that relate to the individual acceptance of the internet and the behavior and intention to use can be directly applied in these learning communities of students in VET.

Limitations and future directions

Several limitations in the current study should be taken into consideration. Firstly, actual use was not included along with facilitating conditions, voluntariness of use and experience. Another study to improve the predictive power of UTAUT might examine some of these factors of adoption within a wider scope of the literature. Secondly, there may be differences within the voluntary nature of those who responded to the questionnaire and those who did not. The sample selected in the study is from twenty-four partnerships in the Netherlands and therefore could be replicated in the future to include more students in other learning tracks and regions to create more generalizable findings. Also, the idea under study was designed as a hypothetical use case to draw out and test consequences of using an action camera as a learning technology. Participants may have felt the concept as too abstract for understanding and could not anticipate what actual use would intend. Thirdly, the CFA technique was just one model used in the study, and generally more evidence is needed to arrive at strong theoretical support. Running additional models and alternative tests is suggested since both the UTAUT and the technology literacy instrument were altered during the final factor analysis loadings and may need re-validation. Lastly, the study is cross-sectional, meaning that individuals' perceptions are measured in a single point in time. Future studies could use a longitudinal approach that would be able to predict one’s perceptions and behaviors over time as well as strengthen the understanding of the variables that lead to acceptance by individuals and the UTAUT model for learning technology.

In the context of a vocational education setting, this study confirms the UTAUT’s independent variable, performance expectancy as moderated by technology literacy, in predicting students' behavioral intention to accept GoPro for training and learning purposes. Despite previous research, effort expectancy and social influence were not found to be significant predictors of vocational students' behavioral intent along with age and technology literacy as moderators. Additional research could be used to determine their significance as predictors and moderators. Thus, this dissertation contributes to the body of knowledge in technology acceptance and video-based learning and training and provides a stage for future research.

Researchers, educators, and policy-makers can also use this information as a guideline in making decisions for adopting new technologies and informing the implementation of video playback in the curriculum.

Technology works as a facilitator. As society changes, that change creates new needs where technology is brought in. What is needed is not new technology, but new ways to use theories and ideas that already exist and rework them into technologies that suit society's needs. As such, this research has in predicting technology acceptance in relation to vocational education and training paradigms.

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Appendix A: UTAUT Constructs

Table 1

Adapted UTAUT Constructs

Construct	Corresponding items
Performance expectancy	**PE1:** With a GoPro I can learn better.
	PE2: The GoPro will allow me to finish my BPV faster
	PE3: The GoPro allows me to work better
	PE4: I'm going to get higher grades with a GoPro
Effort expectancy	**EE1:** It's easy to learn how a GoPro works
	EE2: Using the GoPro seems difficult to me
	EE3: Using a GoPro seems easy to me
	EE4: I think GoPro takes a lot of time
Social influence	**SI1:** At work, they'll be fine with me using a GoPro
	SI2: My boss will want me to use a GoPro
	SI3: My school will want me to use a GoPro
Behavioral intentions	**BI1:** I want to use the GoPro for my written assignments
	BI2: I want to start using the GoPro as soon as possible

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Appendix B: Technology Literacy Scale

Table 2

Technology Literacy Scale Questionnaire

Category	**Corresponding Items**
Camera and PC Interaction (CPC)- 3 items	CPC1: I can connect camera and USB sticks to a computer. CPC2: I can see with my computer what videos are stored on my USB stick. CPC3: I can copy movies from a USB stick to my computer.
Web Browser Capabilities (WBC)-3 items	WBC1: I know how to look things up on the internet. WBC2: I can log in to a personal page (for example, Facebook, Netflix, Hotmail). WBC3: I can upload photos and videos to a website.
Communicative Applications Usage (CAU)- 3 items	CAU1: I can use e-mail. CAU2: I can send photos and videos via e-mail. CAU3: I can use WhatsApp.
Smartphone Usage (SMU)- 4 items	SMU1: I can send photos and videos from my phone. SMU2: I can download and install new apps on my phone. SMU3: I can connect my phone via Bluetooth with other devices. SMU4: I can connect phone via Wifi.

Appendix C: UTAUT Factor Loadings

Table 8

Factor Loadings Resulting from a Principal Axis Factoring Using Oblique Rotation (N = 44)

Item	Factor 1	Factor 2	Factor 3
PE1: With a GoPro I can learn better	**.55**	.20	
PE2: The GoPro will allow me to finish my BPV faster	**.85**		-.11
PE3: The GoPro allows me to work better	**.68**		
PE4: I am going to get higher grades with a GoPro	**.48**		
SI2: My boss will want me to use a GoPro	**.54**		.33
SI3: My school will want me to use GoPro	**.57**	.18	
SI1: At my work, they will be fine with me using a GoPro			**.93**
EE4: I think GoPro takes a lot of time	.11		**.49**
EE1: It is easy to learn how a GoPro works	.24	**.63**	-.20
EE3: Using a GoPro seems easy to me	.10	**.68**	
EE2: Using a GoPro seems difficult to me	-.10	**.74**	
Eigenvalues	4.08	1.76	1.12
% of explained Variance	32.58	12.45	6.23

Note. Factor loadings over .40 appear in bold.

Appendix D: Technology Literacy Factor Loadings

Table 9

Factor Loadings Resulting from a Principal Axis Factoring Using Oblique Rotation (N = 43)

Item	Factor 1	Factor 2	Factor 3
CPC1: I can connect camera and USB sticks to a computer	**.63**	.05	.41
CPC2: I can see with my computer what videos are stored on my USB stick	**.55**	.47	.02
CPC3: I can copy movies from a USB stick to my computer	**.97**	.00	-.11
WBC3: I can upload photos and videos to a website	**.77**	-.01	.00
WBC1: I know how to look things up on the internet	.12	**.83**	.11
WBC2: I can log in to a personal page (Netflix, Facebook, Hotmail)	-.00	**.91**	-.02
CAU1: I can use e-mail	-.05	**.82**	.25
CAU2: I can send photos and videos via e-mail	.03	**1.04**	-.12
CAU3: I can use WhatsApp	.01	**.47**	**.64**
Eigenvalues	1.32	6.44	.442
% of explained Variance	12.77	70.30	3.63

Note. Factor loadings over .40 appear in bold.