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**Article (Accepted version)  
(Refereed)**

**Original citation:**

Phelps, Joshua M., Strype, Jon, Le Bellu, Sophie, Lahlou, Saadi and Aandal, Jan (2016) *Experiential learning and simulation-based training in Norwegian police education: examining body-worn video as a tool to encourage reflection*. *Policing* . ISSN 1752-4512  
DOI: [10.1093/police/paw014](https://doi.org/10.1093/police/paw014)

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Title: Experiential learning and simulation-based training in Norwegian police education:  
examining body-worn video as a tool to encourage reflection.

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## Abstract

This research paper aims to add to current knowledge on reflection, body-worn video and police education. It examines the potential effects of an intervention which employed subcams (a type of body-worn video) and replay interviews of video footage to enhance experiential learning during an operative training course for Norwegian police students in their final year of study. Our investigation examines evaluation surveys for differences between an intervention and comparison group on reflection and experiential learning outcomes. Findings indicate that students in the intervention group self-reported more general learning outcomes from the course concerning decision-making and communication and that they could identify their own mistakes to a greater degree. They also reported more learning outcomes as measured by the number of statements written about what they learned and would change to improve their performance on 3 different simulations. Moreover, the content of these statements reflected the intervention as they involved communication and decision-making to a greater degree than students in the comparison group. Implications for the further use of body-worn video to encourage reflection and enhance experiential learning in professional police training and development are discussed.

## Introduction

This paper presents research incorporating two current trends in policing. First, there are an increasing number of practitioners and researchers implementing or recommending experiential learning and reflective practice approaches as cornerstones of police education (Christopher, 2015a; Copley, 2011; Lauritz, Åström, Nyman, & Klingvall, 2013). Second, there has been a proliferation in the use of body-worn video devices in policing (Ariel, Farrar, & Sutherland, 2014; Drover & Ariel, 2015; Ellis, Jenkins, & Smith, 2015; Harris, 2010; Lum, Koper, Merola, Scherer, Reioux, 2015; Neyroud, 2013; Rieken, 2013). Psychological and behavioural research and development based on first-person video capture and reflection on recording (e.g. Lahlou, 2011; Lahlou, Le Bellu, & Boesen-Mariani, 2015; Le Bellu, Lahlou, Nosulenko, & Samoylenko, 2016) suggest that Body-Worn Video devices (BWV) may offer significant, but currently unexploited opportunities to enhance professional police development. We present empirical research examining whether BWV may be used to enhance experiential learning and encourage reflection in the context of simulation-based training for Norwegian police students. We first discuss experiential learning, reflection, and police education, followed by a brief section on the possibilities of body-worn video to encourage reflective practice for policing professionals. We then describe the context of our intervention followed by a presentation and discussion of results.

### ***Experiential learning, reflection, and professional development in the police***

Fostering experiential learning (EL) is increasingly becoming an explicit goal in police education (Christopher, 2015a; Copley, 2011; Lauritz, et al., 2013; Nikolou-Walker & Meaklim, 2007; Wingrave, 2011). Kolb (1984, p. 38) defines experiential learning as “the process whereby knowledge is created through the transformation of experience.” A key aspect of EL involves reflection, understood here as actively deliberating upon and critically

evaluating one's actions on a given experience. According to educationalists, EL occurs when reflection leads to active experimentation during new experiences aimed at changing or improving upon past experiences (see e.g. Kolb, Boyatzis, & Mainemelis, 2001). Others also suggest that students are encouraged to develop *reflective practice* (Schön, 1983) in order to become competent and socially responsible practitioners who can adapt to increasingly complex situations throughout their professional career (Bulman & Schutz, 2013; Christopher, 2015a; Copley, 2011; Mann, Gordon, & MacLeod, 2009). This means that reflection becomes a habit and contributes to the critical evaluation of and improvement of professional performance.

Educational programs in nursing, social work, business, and teaching explicitly design training around reflection through e.g. journal writing, the use of video feedback and debriefing sessions (Bulman & Schutz, 2013; Fleck & Fitzpatrick, 2009; Mann, et al., 2009). Researchers point to the difficulties of measuring outcomes of experiential learning and suggest that more systematic studies on reflection and professional development are needed (e.g. Adams, Matto, & LeCroy, 2009; Gosen & Washbush, 2004; Mann et al., 2009; Samuals & Betts, 2007). Our study contributes to such research in the context of police education where the role of reflection in training has received considerably less attention.

### ***Police education, experiential learning, and reflection***

While EL in general and reflection in particular have received more significant and explicit attention in other professions there are two notable exceptions related to police education. First, there has been an increased emphasis amongst police educators on adapting police training toward so-called “adult” or “life-long” learning by moving away from more traditional, military-type and instructor-driven training (see e.g. Birzer, 2003; Bradford & Pynes, 1999; Marenin, 2004; McCoy, 2006; Vodde, 2012). Proponents of this shift have

suggested that EL perspectives, albeit initially without an explicit focus on reflection, are necessary for developing communication, problem-solving, and critical thinking skills essential for community policing (e.g. McCoy, 2006; Vodde, 2012) or problem-oriented policing (Bradford & Pynes, 1999; Nikolou-Walker & Meaklim, 2007). More recently researchers and practitioners have highlighted that reflective practice is central and should be encouraged throughout police training and development (Christopher, 2015a; College of Policing, 2015; Copley, 2011; Lauritz et al., 2013). Second, perhaps the most commonly reported research detailing how police training has facilitated EL is through simulation-based training exercises (Alison, van den Heuvel, Waring, et al., 2012; Bennell, Jones, & Corey, 2007; van den Heuvel, Alison, & Crego, 2012). Simulations may contribute to the development of professional intuition and decision making by providing structured experiences in an environment designed to encourage flexible internalization through the use of critical reflection. Several studies on police training provide examples of simulations that may enhance conflict-resolution and decision-making skills (Helsen & Starkes, 1999); improve police officers' interactions with the mentally ill (Krameddine et al., 2013) and handgun shooting performance under pressure (Oudejans, 2008); or be particularly effective to research complex and risky decision-making during critical incidents (Alison et al., 2012; Eyre, Crego, & Alison, 2008; van den Heuvel, et al., 2012).

Apart from these studies, we have found few systematic investigations of EL in police education. Neyroud's (2011) review of police leadership and training practice, led him to claim that systematic studies of police training, including evidence for effectiveness of various practices "was limited" at best. Meanwhile, Christopher (2015a) suggests the relationship between reflective practice and policing seems more often than not to be implicit and informal. There is also some evidence from the studies highlighted above that adapting and implementing EL approaches in police education may not be straightforward. For

example, McCoy's (2006) investigation of police teaching styles identified challenges in fostering EL and "adult learning" in American police training. He found that a traditional instructor-centered approach still seemed to dominate training contexts, leading to the establishment of a clear dichotomy and hierarchy between expert and novices, which interfered in the facilitation of experiential learning for trainees. Lauritz, et al. (2013) found that Swedish police students did not necessarily adopt or prefer a reflective learning style, suggesting that there could be a degree of resistance when encouraging the police to actively reflect over their own activity. There may also be a number of drawbacks to simulations where systematic EL approaches have been most reported. For example, if participants do not experience or act in the situation as similar to real life (e.g. Alison et al., 2012; Stokoe, 2013) or if instructors do not provide participants with the correct simulation competence in the preparation phase (e.g. Sjöberg, Karp, & Söderström, 2015) then simulations may not be that effective in stimulating reflection.

In the Norwegian police educational context, activities such as role-play, simulations, and practical placement form a substantial part of training. These activities clearly aim to provide students with experiences designed to encourage experiential learning through reflection during or after action. However, explicit reflection remains limited, as sessions where individuals or groups reflect upon their own practice with a third party (typically the teacher) are time consuming and uses substantial resources. Hence, systematic investigations of reflection and follow-up to assess potential learning outcomes are rare both internally in Norwegian police training and externally, at least through available peer-reviewed studies. The main goal of the present research is to increase knowledge on reflective practice and the police by exploring the potential effects of a new method using body-worn video to foster experiential learning amongst police students.

***Body-worn video, reflection, and policing***

Our intervention to encourage reflection makes use of first-person perspective video footage taken with body worn video (BWV) devices during operative training. BWV or wearable cameras, are attached to a person's body (e.g. head or chest) and record an individual's activity from a first-person perspective. Social scientists have illustrated how BWV and other life-logging devices may be used in social research to offer new insights into human behaviour, social interaction and knowledge transmission (Doherty, Hodges, King et al., 2013; Kelly, Marshall, Badland et al., 2013; Lahlou, 2011; Lahlou et al., 2015; Le Bellu, 2016; Le Bellu, et al., 2016; Mann, Nolan, Wellman, 2003; Rieken, Garcia-Sanchez, Trujillo, & Bear, 2015). For example, first-person video footage taken with BWV has been shown to facilitate the remembering of mental processes at the time of action (Lahlou, 2011) and improve participants' understanding of their own activity (Lahlou et al., 2015). Even more importantly for the present investigation, they may also be used to enhance professional education and development (e.g. Fleck, 2012; Fleck & Fitzpatrick, 2009; Le Bellu, 2016; Le Bellu et al., 2016). In addition, BWV is increasingly becoming adopted by the police in a range of contexts and purposes (Ariel, Farrar, & Sutherland, 2014; Drover & Ariel, 2015; Ellis, Jenkins, & Smith, 2015; Harris, 2010; Lum et al., 2015; Rieken, 2013). Some trial studies of BWV in the field have focused on the implementation of the technology and various benefits or consequences for operative police work (e.g. Ariel et al., 2014; Grossmith et al, 2015; Owens, Mann, McKenna, 2014). However, one potential function of BWV that is thus far under-represented involves the ways in which BWV may enhance police training (see also Lum et al., 2015, p. 19). Grossmith et al.'s (2015) found that a secondary outcome of BWV implementation in London was that officers used video footage to examine their own behavior, leading them to claim that BWV could lead to professional development and provide examples of good practice. Meanwhile Owens et al (2014) also found that officers reported that BWV made them feel more accountable and aware of their own behaviour



which could be taken as a sign of reflection. We believe that these findings provide support that BWV should be examined more systematically in relation to police training. In particular, we argue that the use of BWV in training may offer innovative opportunities to train police officers into critically reflective practitioners (Christopher, 2015a) through its ability to capture first-person perspective video footage which may then be used to stimulate reflection.

**The current project: Simulation-based training of third-year police students at the Norwegian Police University College .**

Our investigation focuses on evaluating the potential effects of an intervention using subcams, a type of BWV worn at eye-level (see Lahlou, 2011), during simulation-based operative training for final-year Norwegian police students. Compared to chest-worn BWV, subcams capture the direction of the attention of the officer as they are placed as close to eye-level as possible and record head movements. We applied the intervention on three cases that encompassed both critical incidences and situations involving social interaction with the public. We attempted to focus upon key skills for both types of incidences, namely communication and decision-making. Before describing the intervention in more detail, we now provide more detailed information on the operative training for Norwegian police students.

In order to enter the Norwegian police force, all police students must obtain a three-year bachelor's degree through the Norwegian University Police College. The first and last year involve theoretical and practical courses mostly on campus, while the second year consists of practical placement. Students receive 5 modules of operative training throughout their final year of study (Politihøgskolen, 2014), completing the modules at one of three main campuses and at one of two training facilities. On campus they have blocks of operative

training throughout the year that involve a communication and conflict resolution course which combines theory and case-based scenarios, an operational situation training course, apprehensive techniques, physical training, and applied criminology. These courses are designed by a diverse group of instructors with various backgrounds from police, pedagogy and the social sciences.

In addition, all third-year students (roughly 720 each year) must complete a three-week operative module (SERT<sup>2</sup>) at a training camp designed and administered by police instructors. This SERT training is the focus of the present study. SERT is based on police tactical manuals and adjusted for different competency levels in the police. The training is based upon internal institutional policies for operative police work and also attempts to mirror current practical issues in policing. According to the curriculum, SERT aims to provide students with knowledge in police operations, planning, and orders; use of force; and first aid (Politihøgskolen, 2014). Upon completion, bachelor students are expected to have improved their skills involving situational appraisal, basic police tactics, how to use firearms and equipment, and how to ensure safety for the police and public during police operations. Finally it is expected that students have the competence to participate in regular police operations and follow the correct legal procedures, rules for use of force, and tactical plans once they enter the police force.

Present conditions at training facilities means that about 120 students from the same student cohort participate in SERT for the three-week duration of each course. This group of students are further divided into two equal groups and are then sent to one of two separate training camps (here described as Camp A and Camp B),. Students receive basic classroom and scenario-based instruction in weapons and police tactics during the first two weeks, and

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<sup>2</sup> We have chosen here to use the Norwegian acronym applied by the operative training instructors at the police university college.

are evaluated on use of firearms in the second week. The final week comprises mostly scenario-based training which aims to apply and integrate weapons and tactical skills. The students must complete in total six simulations with live actors and without the assistance of instructors during the final two weeks of the course. These scenarios are based on real-life situations ranging from common operative situations (e.g. answering a call concerning public disturbance) to more critical incidences (e.g. locating and apprehending an active shooter). Moreover, the training is reproduced in settings as close to reality as possible (e.g. a mock city with a main street and shops). The same scenarios are run at Camps A and B simultaneously in an effort to standardize training and accommodate as many students as possible. Camp A and B thus have comparable training including the same curriculum, exam, and simulations. The only differences between the two is that they have different instructors and different physical locations in which the simulations are conducted. Students work mostly in pairs or groups of four depending upon the nature of the scenario and are debriefed by an instructor upon completion of each case.

### ***Applying Subjective Evidence-Based Ethnography (SEBE) as a method to encourage reflection***

Our intervention took place at Camp A during the final three days of training for a group of 32 (of a possible 58) third-year Norwegian police students that agreed to participate in our BWV intervention. Concretely, we applied Subjective Evidence-Based Ethnography (SEBE, Lahlou, 2011; Lahlou, et al., 2015) both to encourage reflective practice amongst Norwegian police students<sup>3</sup> and as a research method to study risky decision-making and improve operative training<sup>4</sup>. SEBE first involves the use of body-worn video (see above) to capture

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<sup>3</sup> The first author was responsible for this part of the project.

<sup>4</sup> The third author was responsible for this part of the project. This research benefitted from an Intra-European Marie Curie grant (grant agreement n°: 330709) for Sophie Le Bellu, and a EURIAS senior fellowship for Saadi

participants' first-person perspective during an activity. The video footage is then used in a "replay" interview in which a researcher or other interviewer (e.g. instructor) and the participant(s) jointly analyse the participant's own activity in detail, based on specific goals of the intervention or investigation. Subcams (see figure 1) were attached to participants' own protective glasses<sup>5</sup>, and recorded their first-person activity in dyads or groups of four during three separate simulations. Central elements across all training exercises involved communication, decision-making, coping with stress, and police tactics. Moreover, each scenario involved a certain element of risk, as making the wrong choice could lead to the potential loss of life to the police or members of the public:

**Shooting in a Building**, was an "active shooter" critical incident in which a perpetrator has opened fire in a public building and students working in pairs had to use correct tactics to locate and apprehend the shooter.

**The Park**, was a community-policing oriented case in which student-pairs received a call about a public disturbance concerning an intoxicated man in a park. Students had to interact with the man to reconcile the public disturbance but were then confronted by an additional member of the public with another task. They were thus required to make a decision about which person to prioritize and how to proceed thereafter.

Finally, **Public Stabbing** was a critical incident case which occurred on the final day of training. Students participated in the exercise in groups of four and had to apprehend one or two perpetrators in possession of a knife. The exercise occurred in a crowded public space in which student-actors role-playing members of the public were injured and or under duress.

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Lahlou at the Paris Institute for Advanced Study (France), with support of the European Union 7<sup>th</sup> Framework Program for research (grant agreement n°: 246561).

<sup>5</sup> Worn during shooting or other case-based training using live ammunition

## **Insert Figure 1**

Replay interviews made use of the subcam footage of each student-patrol and occurred either immediately following the simulation (Shooting in a Building) or in the evening after the simulation (The Park, Public Stabbing). Student-pairs were interviewed by one of five researchers using a semi-structured interview-guide based upon activity theory (see e.g. Lahlou, 2011). Incidentally, this method removed some of the problems with expert-novice dichotomies that McCoy (2006) found problematic as the interviews occurred without police instructors leaving the students to analyse their performance (in the context of the interview guide) on their own terms. They were asked to jointly reflect explicitly on their own practice as they watched the recordings of their actions with their partner. The interviews focused specifically on facets of risky-decision making including perceptions of risky elements in the situation, communication with partner and members of the public and individual goals and plans within the specific case<sup>6</sup>. Moreover, the subcam footage was used to help participants identify critical moments throughout each simulation and assist in articulating learning outcomes for the student-pairs. The length of all replay interviews lasted between 30 minutes and 1 hour.

## **Method**

This study makes use of evaluation questionnaires distributed electronically twenty days upon completion of the course to all 118 students that completed SERT at both camps during the dates in which we conducted our intervention. The link remained open for four weeks with the last recorded response occurring forty-six days upon SERT's completion. We sent three email reminders to complete the survey and posted a notification on class Facebook groups to encourage responses. In total, 67% of students that took the course responded to the

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<sup>6</sup> The third author had the main responsibility for designing the interview guide as a part of her research project (see footnote above).

questionnaire (66% men, which is close to the normal gender division at the college). Our analysis predominantly compares two groups from the initial respondents<sup>7</sup>: 29 students that took part in the SEBE intervention at Camp A (91% response rate of students in the intervention group) and 34 students from Camp B (57% response rate).

The evaluation questionnaire included the following:

Background information:

*Age, Gender, Training Camp (A or B)*

*Police identity* was measured with a five item numerical rating scale with labels at the end points (*completely agree* and *completely disagree*, Cronbach's alpha = 0.84). The scale assesses the degree in which students expressed a professional identity (developed from Hall 1968, see Mastekaasa 2009), example item, *Being a police officer is an important part of my life*.

Preferences for learning and reflection:

*Reflective thinking*: Three items measured (Cronbach's alpha = 0.71) using a 5-point scale from a subscale of Kember et al.'s (2000) measure of reflection, assessing the degree in which students report a tendency to reflect over and improve upon their own actions, e.g. *I often reflect on my actions to see whether I could have improved on what I did*.

*Task value*: Six items (Cronbach's alpha = 0.96), 7-point scale, with the labels *not true at all true of me* and *very true of me* at the endpoints, assessing the importance and value students placed on the content of the SERT training (e.g. *It is important for me to learn the course*

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<sup>7</sup> Fifteen respondents from Camp A that did not participate in the intervention but completed our measures were excluded from the present study so that total response rate for Camp A is 76% . They were excluded to avoid the possibility of contamination of their learning process due to contact with students in the intervention group during the evenings of the course where potential effects from reflection could have been shared. The only exception being reliability analyses to calculate Cronbach's alpha in order to maximize potential variance in inter-item correlations.

*material in this class*) and *Peer learning*, 3 items (Cronbach's alpha = 0.92) assessing preferences for peer learning as a learning strategy (e.g. *When studying for this course, I often try to explain the material to a classmate or a friend*). Both scales were adapted from the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991; Pintrich, 2004).

#### General attitudes toward operative training

*Attitudes toward operative training*: Four items (Cronbach's alpha = 0.79), 5-point scale, specifically created for this study using assessed students' perceptions of the importance of this type of training for police work, e.g. *Competence about operative training makes the police's work easier*.

*Importance of operative training*: one item, 5-point scale, assessing the importance students placed on the operative training for police education. *In your opinion, how important is operative training for police education?*

#### Self-reported general learning outcomes related to SERT

*Basic learning assessment*: one item, 5-point scale, *I learned a lot during the training camp*

*Basic learning outcomes*: one item, 5-point scale, *All things considered, how much of a learning outcome have you received from the operative training camp?*

*Critical reflection after SERT* : two separate items, 5-point scale, adapted from the critical reflection subscale of Kember et al.'s (2000) measure of reflective thinking, *As a result of this course, I have changed my normal way of doing things and I have identified mistakes that I used to think were correct during the training camp*.

#### Specific learning outcomes

Involved evaluation of learning outcomes on the operative training module about the *amount of learning and reflection following the course* associated specifically with police tactics, coping with stress, decision-making, and communication, 2 questions for each topic, a 5-point scale, *How much have you learned about \_\_\_\_* and *How much have you thought about \_\_\_\_, as a result of the operative training module.*

#### Qualitative learning outcomes on the simulation-based training

We asked for more detailed learning outcomes on four different simulations at SERT. They were measured with two questions: *List up to 10 things you learned on this case* and *List up to 10 things that you and your partner could improve upon on this case.* The questions covered the three simulations mentioned above, but also one control case, **Apprehension in Vehicles**<sup>8</sup> in which the SEBE intervention was not applied. We considered these qualitative learning outcomes to be the most direct measure of reflection and EL as they were based more on recall and deliberation on activity as opposed to the more general self-reported evaluation described above.

We also assessed statement content by coding all (natural language) statements and categorizing them into themes. The first and second author, blind to condition during the whole process, coded the statements independently. We analysed the first set of statements for each participant on each case and constructed a list of common themes that emerged. We then jointly agreed upon a coding-scheme and proceeded to code the statements independently. After the first stage of coding we compared scores and redeveloped the coding scheme to cover points of discrepancy. We repeated the process of developing a coding scheme and comparing scores until our inter-rater reliability was acceptable (0.74) for the first learning outcome on all four cases. After that, the first author coded all statements according to the

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<sup>8</sup>This simulation had three posts in which students had to arrest a person in or out of a vehicle. It occurred either immediately before or after participants had completed the Public Stabbing simulation in our intervention on the final day of the course.



final coding scheme, remaining blind to conditions. Statements that covered multiple categories or in which the first author was in doubt were discussed jointly with the second author. The final five coding categories were: Police Tactics, Decision-Making and Leadership, Communication and Cooperation with Partner, Concrete Reflections on the Situation, and Stress (see Appendix for examples).

## Results

We first examined differences between the intervention group from Camp A and the comparison group at Camp B on six different measures: Police identity, Reflective Thinking, Peer Learning, Task Value, Attitudes toward SERT, and Importance of SERT. The only significant difference in scores on these measures was on Task Value ( $t = 2.24$ ,  $df = 59$ ,  $p < .05$ ) as participants at Camp B placed greater value in the operative training module ( $M = 6.52$ ,  $SD = 0.57$ ) in comparison to the intervention group at Camp A ( $M = 5.91$ ,  $SD = 1.40$ ). Moreover, there was also a notable difference in standard deviations between the two groups on this measure indicating more variability in how much importance students in the intervention group placed on operative training.

We then investigated whether or not there were statistically significant differences that could suggest that our intervention led to changes in learning outcomes since both groups were similar on a majority of expected measures, and thus deemed comparable. We first examined differences on four separate items assessing *General learning outcomes related to SERT*. There was only one statistically significant difference between the groups ( $t = -1.982$ ,  $df = 59$ ,  $p = .05$ ) as the intervention group ( $M = 3.21$ ) expressed more agreement with the statement *I have identified mistakes that I used to think were correct during the training camp* than the comparison ( $M = 2.69$ ) group (about noticing mistakes,).

Next, we examined potential differences between *Specific Learning Outcomes* about *Amount of Learning* and *Reflection Following the Course* connected to four specific facets of operative training: police tactics, coping with stress, decision-making and communication (see Table 1).

***Insert Table 1***

As illustrated in Table 1, the intervention group reported learning more about decision-making and communication than the comparison group. They also thought more about experiences involving coping with stress following the course. However, these self-evaluation measurements on learning outcomes were broad and relatively unspecific. Therefore further analysis focused upon the qualitative measures of learning outcomes specifically related to the different simulations.

We first examined the total number of statements across all three simulations from the intervention (Shooting in a Building, The Park, and Public Stabbing). The intervention group recalled on average more instances of learning (12.5 vs. 8.8) and possibilities for change (7.3 vs. 4.6) and the differences were statistically significant (respectively  $p < .02$  and  $p < .01$ ; see Table 2). For the control case Apprehensions in Vehicles, however, there were no statistically significant differences on number of statements between groups.

***Insert Table 2***

We then investigated whether or not the groups differed in content of statements, and therefore reflection. We combined all three cases together for statistical reasons, i.e., ensuring a sufficient number of statements to calculate z-scores. In addition, this procedure provides a broader overview of learning at the course level. We calculated the percentage of participants in each group that included statements in each category identified in the coding scheme. We then conducted a 2-sample Z-test to identify if differences in percentages were statistically

significant. As can be seen in Table 3, the intervention group included significantly more statements about communication and decision-making involving both reflections on what they had learned and what they would change about their performance.

### ***Insert Table 3***

Finally, we performed a similar analysis on the control case to investigate if the intervention might have had any “spillover” effects, potential indicating reflective practice (i.e. that reflection becomes a habit and applied outside of the intervention). The only noteworthy and statistically significant difference in this regard was that 34.5% of participants in the intervention group included statements about *communication* compared to 12.5% in the comparison group ( $Z = 2.00$ ,  $p = 0.04$ ).

### **Discussion**

Our analysis suggests that BWV devices may be particularly useful to stimulate reflection amongst Norwegian police students. The use of subcams in combination with replay interviews led to marked differences in experiential learning outcomes for this intervention group compared with a comparison group. Students reported learning significantly more about communication and decision-making (Table 1) and they identified mistakes in their performance to a greater degree following the course (p. 15). Beyond mere self-evaluation, they were able and willing to articulate a greater number of actual examples of what they had learned and thought about changing based on their performance across three different simulations involving both everyday police encounters with the public and critical incidences. (Table 2). The content of these learning outcomes also promisingly corresponds to our intervention which focused predominantly upon communication and decision-making (Table 3). This may indicate that learning outcomes may be enhanced for whatever topic is focused

upon in the replay interviews, and hence could be applied to other areas of police training in the future.

Furthermore, these findings are further strengthened because there were no notable differences between intervention and comparison groups on preferences for reflection, peer learning, degree of police identity, or general attitudes toward operative training. In fact, the only statistically significance difference between groups was based on task value, in which the comparison group expressed more interest in the operative training course itself. Hence, we could have reasonably expected that these participants were more interested in learning and retaining knowledge about the simulations during this particular operative training. Instead, we find the opposite to be the case when it comes to communication and decision-making. Another intriguing finding in this regard is that the intervention group expressed greater variability on task value of the operative training. This could potentially be an indicator that our intervention led to reflection which created more nuances in how the students viewed the course overall, leading perhaps to critical reflection on the training. Hence, we may speculate that variability, and hence more heterogeneity, could have been a function of more focused reflection, especially as the groups were so similar on all other independent measures. This should be explored in future research.

Although we are greatly encouraged by these results, we must also express caution. There are a number of limitations to our study, both methodologically and conceptually regarding reflection and reflective practice. First, our data is derived from Norwegian police students taking part in a specific type of operative training involving critical incidents and a public order disturbance. Hence it is clearly embedded in the Norwegian (police) culture, context of a higher education degree, and a specific type of police student. The students in the present study were mostly positive to the intervention and open to self-criticism which seemed to facilitate reflection over their actions including the discussion of potential

“mistakes”. More research is clearly needed in other police populations and training exercises. We hope that this data may encourage other police educators and researchers to conduct similar interventions and report them to a greater degree.

Our design cannot exclude the possibility that students in the intervention group could have demonstrated changes in learning due to merely having extra time to reflect on the different cases, or the positive effect of participating in an experiment (Mayo, 1945; McCambridge, Witton, & Elbourne, 2014). Also, while there is a clear institutional requirement at the police college that all training is similar at both camps, including sharing the same exercises and curriculum, we cannot discount the fact that there could have been differences between Camp A and B (e.g. in instructors, training location) that lead to different learning outcomes. However, again, we should point out that there were no statistically significant differences between the groups (see above) which could have been signs of differences between populations. Nonetheless, the implementation of randomized controlled trials in police training similar to other research on BWV in operative contexts (Drover & Ariel, 2015; Grossmith et al., 2015) would better address these limitations. Exposing groups of police students to different methods to foster experiential learning (e.g. after-action reviews or group debriefing sessions) both with and without BWV would greatly enhance our confidence in findings regarding potential changes related both to technology and methods to encourage reflective practice. New research should also ensure that both intervention and control groups receive an equal opportunity to reflect upon each simulation (in the present study this would be between 1.5-3 hours of extra time to discuss cases).

Next, although our intervention occurred across multiple days of simulation-based training and assessed students several weeks after training, we have only small indications that the intervention encouraged reflective practice as a habit. We find encouragement in the finding that the intervention group had significantly more statements about communication on

the control case which may indicate that students continued to reflect on other cases to a greater degree. We are currently working on developing more longitudinal interventions and ways of measuring reflective practice that will hopefully yield more reliable evidence in this regard.

While we support the encouragement of critical reflection in policing (Christopher 2015a, 2015b), the present study is nonetheless rather limited in this regard. As Samuals and Betts (2007) note, research suggests that reflection tends to occur descriptively (questioning what happened and what could be done differently in a situation/experience) as opposed to analytically (how and why a situation/experience occurred). As we have focused mainly on descriptive evidence of reflection through self-reported evaluations or open-ended statements on learning outcomes, our study predominantly falls on the descriptive side. While the qualitative learning outcomes provided potentially more indicators of analytic reflection, we were unable to reliably code statements in terms of level of reflection (e.g. on a descriptive or analytical axis) or rate the complexity of responses to provide indications of critical reflection. New studies should look at different ways to assess critical reflection (e.g. through analysis of dialogue in replay interviews) and measure potential changes to professional performance as experiential learning outcomes such as observing performances on similar simulations or in actual police practice. Additionally, given the proliferation of BWV devices for operative police work it may also be possible to use real-life footage similar to Rieken's (2013) study on police discretion or build upon Grossmith et. al's (2015) findings that officers used footage to examine their own behaviour, as a means of researching reflective practice outside of a police educational context, given that the appropriate ethical standards of research are developed and applied (see Kelly et al., 2013).

We conclude our discussion by highlighting potential challenges for research and the implementation of first-person perspective BWV technology to encourage reflective practice

in police training, which we argue meets Innes's (2013, p. 16) definition of police innovation. In general, the introduction of technological innovations that potentially change or challenge policing practices and cultures have been faced with a number of difficulties (e.g. Drover & Ariel, 2015; Gundhus, 2012; Innes 2013; Manning, 2008; Owens et al., 2014; Reiner, 2010). There will inevitably be concerns within police educational institutions involving how the resources needed for BWV interventions (technology, potential interference with simulations, time for reflection, facilitators for reflection, etc.) may fit into the budget, curriculum, and/or allocated time for training. Support for interventions will also be weighed up against if the technology is perceived to offer something considerably more beneficial than what current methods are seen to provide. Additionally, there are also a number of practical issues that should be expected with BWV devices such as failure to record, obscured perspectives, or whether the devices are perceived to interfere with performance (see e.g. Owens et al., 2014).

Gathering systematic evidence about BWV and experiential learning which may provide evidence to justify innovation will most likely be constrained not only by resource and device issues, but also obstacles related to student/officer compliance (Drover & Ariel, 2015; Owens et al., 2014). In our current study, researchers were heavily involved in the recording and reflection process, thus increasing the likelihood of student participation. However, this is unsustainable if similar interventions are to be implemented on a larger scale. Receptiveness both by individual students/officers and within police organizations will also depend upon course and training content. The operative simulations in which we have based our interventions (e.g. active shooters, prioritizing an intoxicated person or a missing child) are typical situations involving risk that Norwegian police students tend to consider both important and interesting. Students and more experienced officers may be less inclined to use BWV in training that focuses on tasks perceived as less risky or exciting such as service or control simulations and/or in which other challenging aspects of policing might be scrutinized

(e.g. police discretion, stop-and-search, officer use of stereotypes). To address this potential resistance in the future we suggest applying Drover & Ariel (2015)'s findings as a starting point. Successful interventions will need to gain support within the organization via police leaders as well as develop clear strategies to maintain compliance beforehand.

Finally, combining BWV and critical reflection has the potential to touch upon both experience-based knowledge which is traditionally valued in the police (Bayley & Bittner, 1984), and more scientific or evidence-based approaches involving the systematization of knowledge (e.g. Gundhus, 2012). A main strength of recommending our current approach within police organizations is that it focuses on the generally well-received former type, using first-person perspective footage of police professionals' own experience as a starting point for reflection. However, reflective practice should ideally encourage police practitioners to integrate more rational and theoretically based knowledge. For example, this could be in relation to professional ethics or how their own decision-making and communication with the public may contribute to upholding or changing wider patterns of social relationships identified through statistical or theoretical knowledge from the social sciences. However, given the challenges that researchers such as Manning (2008) and Gundhus (2012) have identified in incorporating new technology and scientific knowledge within police organizations, one may expect and should research potential resistance to BWV interventions that move beyond the type of descriptive reflection in operative simulations which has been our focus in the present study.

## **Conclusion**

We believe that our analysis of evaluation surveys after an intervention during operative training in Norway is one of the first to investigate and report the use of BWV on reflection and experiential learning in a police training context. Our findings provide encouraging evidence that BWV in combination with systematic interviews may enhance reflection during



simulations. Specifically, we have found that our intervention applying SEBE to augment operative training seemed to enhance learning outcomes involving decision-making and communication. We hope that this study encourages other police educators and researchers to use BWV and different methods of reflection outside of the Norwegian context. Our findings illustrate that advocates of reflective practice in policing should seriously consider the possibilities that BWV may bring to enhancing police education and development, and begin conducting more systematic investigations to better understand potential experiential learning outcomes. For our part, we are currently designing interventions aimed at encouraging critical reflection throughout Norwegian police education as well as attempting to measure potential outcomes on a longitudinal basis.

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## Tables and Figures

**Table 1**

	Mean Intervention Group	Mean Comparison Group	T	P-value	df
<i>How much have you learned about the following as a result of SERT</i>					
Police Tactics	4.48	4.56	0.50	ns	59
Stress	3.69	3.50	-0.73	ns	59
Decision-making	4.00	3.47	-2,58	0.012	59
Communication	3.72	3.22	-2.25	0.03	59
<i>How much have you thought about the following as a result of SERT</i>					
Police Tactics	4.45	4.77	1.80	0.08	58
Stress	4.17	3.65	-2.09	0.04	58
Decision-making	4.17	3.87	-1.17	ns	58
Communication	3.76	3.95	0.67	ns	58
1 = Have learned very little      5 = Have learned quite a lot					

Table 1: Differences between intervention and comparison group on Specific Learning Outcomes

**Table 2**

	Mean Intervention Group	Mean Comparison Group	T	P-value	df
Statements about learning	12.5	8.8	-2.35	0.02	59
Statements about change	7.3	4.6	-2.76	0.01	59

Table 2: Mean number of statements assessing qualitative learning outcomes for three simulations

**Table 3**

	Intervention Group	Comparison Group	Z-value	p-value
<b>Learned</b>	%	%		
Police Tactics	93	91	0.3	0.77
Concrete situation	76	69	0.6	0.54
Decision-making	55	28	2,10	0.03
Communication	90	63	2,50	0.013
Stress	69	47	1,70	0.08
<b>Change</b>				
Police Tactics	76	78	0,20	0.85
Concrete situation	48	31	1,40	0.17
Decision-making	41	19	1,90	0.06
Communication	90	66	2,20	0.03
Stress	21	9	1,30	0.19

Table 3: Percentages of students in each group writing a statement in each category, z and p-values.

**Figure 1**

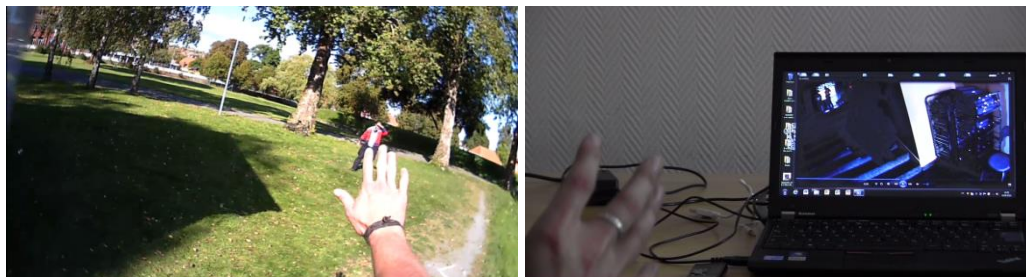


Figure 1: Still image of video footage from a subcam and replay interview used in SEBE

## Appendix

Examples of statements written for each code

### Learned

Police tactics: *It's important that police tactics are internalized*

Situation: *The shield is heavy to carry for a long time; One needs to be prepared for strong sensory images*

Communication:

*The importance of good communication internally between partners in the team was underlined; Communication is essential to resolve a mission*

Decision-making: *I am skilled at evaluating the importance of a mission and making a prioritized decision.*

Stress: *How my body reacts under stress; How to cope with stress in a chaotic situation*

### Change

Police tactics: *Adjusting distance to the dangerous area; Make small improvements to apprehensive techniques*

Situation: *I should have been more direct with the drunken man and given him a warning; I should have used more time*

Communication: *(We should) have communicated better so that everyone understood what happened; We could have communicated better within the group*

Decision-making: *(We) should have made a quicker decision*

Stress: *Avoid tunnel vision*