



## Research article

## Stakeholders' attitudes towards the installations of closed-circuit television cameras in reducing school violence

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## ABSTRACT

**Purpose:** While schools worldwide have employed closed-circuit television (CCTV) to discourage school violence, the literature shows that stakeholder attitudes toward adopting this technology are inconsistent across cultures. Generally, they are concerned with effectiveness, necessity, privacy, and operational transparency. Based on the Technology Acceptance Model for Video Surveillance (TAM-VS) theory, this study examined the attitudes of educational stakeholders, namely educators and students, toward adopting CCTV in Vietnam. This study aims to investigate which criteria Vietnamese stakeholders use to evaluate the necessity of CCTV and whether the concerns of Vietnam, a developing country, are similar to those of developed countries.

**Methods:** This study addressed these research questions by purposely sampling and interviewing 49 Vietnamese high school students, recent high school graduate students, teachers, and administrators. It employed semi-structured and in-depth interviews to gather content-rich data and applied thematic analysis to discover new insights from stakeholders under the modified TAM-VS framework. The study also followed the COREQ guidelines to improve the transparency and rigor of the data collection and analysis.

**Findings:** On an exploratory basis, most Vietnamese stakeholders believed that while CCTV cannot comprehensively prevent school violence, its effectiveness overshadows privacy concerns. Regarding operational transparency concerns, participants suggested that better communication, consent collection, and the right to amend school policies related to CCTV are important. From the participants' perspective, the three criteria for evaluating the necessity of CCTV were (1) its effectiveness in controlling school violence, (2) serving other purposes to enhance overall schooling performance, and (3) insufficient existing methods.

**Conclusions:** This study provides context-rich insights into the perceptions of the necessity, effectiveness, privacy, and operational transparency concerns of CCTV across different stakeholders in the education and developing country context. On the practical contribution, the research identifies strategies that school administrators can employ to promote CCTV acceptance in Vietnamese high schools.

## 1. Introduction

School violence occurs when school stakeholders, not limited to students and teachers, physically or verbally attack others on the campus. This violence has many forms, ranging from students fighting students, teachers punishing students, and students verbally abusing teachers, and these incidents are at an alarming rate worldwide. After conducting a survey of 96 countries and territories in 2019, The United Nations Educational, Scientific and Cultural Organization (UNESCO) delineate that nearly 30% of children are liable to one act of violence every month and 11.2% of them experienced sexual jokes, comments, or gestures

(UNESCO, 2019). In South Korea, at least once did teachers inflict their acts of emotional maltreatment on students—with the number of approximately 20%—in the form of mockery or humiliation (Cheung et al., 2019). Meanwhile, 80% of American teachers encountered at least one of the 11 different acts of violence on campuses during their previous school years (Yang et al., 2021). More seriously, the prevalence of physical fighting among 68 low-to-middle-income countries is more than 36% and serious injuries account for nearly 43% (Han et al., 2019).

The literature also shows that school violence has been proven to exert substantial, long-term effects on young people's physical and psychological health, along with their social functioning (UNESCO, 2019).

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In terms of violence among students, school violence is one of the primary factors behind serious non-fatal injuries. According to current research across nations, school violence is linked to suicidal intentions, poor mental health, substance abuse, and truancy among students (Senanayake et al., 2019; Pengpid and Peltzer, 2019; Beck et al., 2016; Denny et al., 2016). Regarding violence between students and teachers, an increasing number of research papers from both developed and developing nations have demonstrated that school violence is associated with teachers' disengagement, intention to leave the job, and other undesirable effects such as emotional well-being (Yang et al., 2021). They also discovered a consistent trend throughout the United States, England, South Korea, and Mexico that teachers' perceptions of insecurity and vulnerability resulting from school violence have a detrimental influence on their self-efficacy, which could lead to lower involvement in schools.

Globally, schools have implemented measures to address this issue. Since 1990, there has been an enormous growth in the volume of school security measures worldwide in response to perceived risks among students, educators, and academic communities, including controlled access to academic facilities during school hours, ID badges, strict dress codes, security personnel, and random dog sniffs. However, closed-circuit television (CCTV) is considered to be the most popular measure for tackling school violence and criminal activities (Fisher et al., 2021). Compared with other methods, CCTV has transformed security from active targeting into passive and mass identification with comprehensive real-time supervision features (Andrejevic and Selwyn, 2020). Empirical evidence has also illustrated the effectiveness of CCTV in the educational context and the improvement of CCTV-related technologies, such as campus violence detection based on artificial intelligence, the Internet of Things, school monitoring, and alerting (Ahmed and Echi, 2021; Ye et al., 2021; Qureshi et al., 2021).

However, CCTV also faces the rejection of installation from schools because of reported inconsistencies in its performance in addressing school violence, privacy, and transparency concerns. Tanner-Smith et al. (2018) asserted that there was no difference in the levels of a drug crime, property crime, or firearm possession between schools with or without surveillance cameras. Andrejevic and Selwyn (2020) claimed that CCTV can lead to misrecognition. For instance, Noble (2018) pointed to reports indicating the failure of facial recognition systems to identify African American faces owing to developers using racially skewed data in training the algorithms. Moreover, recent research has indicated that privacy concerns are a major factor in schools' refusal to install CCTVs (Andrejevic and Selwyn, 2020). A study performed in Israel found that even young children, who grow in a digital era with constant surveillance also considerably value their privacy and are willing to give up only when they are convinced (Birnhack et al., 2018). Moreover, Birnhack et al. (2018) found that educators in their study did not discuss CCTV with students. As a result, most students made incorrect assumptions about CCTV. For instance, the students feared that CCTV could record their sounds and images throughout the campuses, including private areas such as restrooms. Because of these problems, an empirical study in the Netherlands showed that the public tends to trust human supervisors or agents more than agents who monitor surveillance technologies (Brands and van Doorn, 2020).

Regarding the inconsistency in the acceptance of CCTV, Fisher et al. (2020) acknowledged that different contexts might influence the findings on the demands and perceived effectiveness of CCTV technology. Currently, most empirical research is conducted in Western countries, where democracy and technological advancements are significant. Therefore, this study chose Vietnam as its research setting. Vietnam is a low-to-middle-income country in Southeast Asia, where violence is also prevalent. In Vietnam, Peltzer and Pengpid (2017) reported that 34.3% of middle-school boys and 25.1% of middle-school girls experience at least one serious injury. In addition, according to UNICEF (2017), from 2013 to 2015, Vietnam's Ministry of Education and Training received 1,600 reports on student violence both inside and outside the school campus, yet the actual number could be much higher. More seriously,

three Vietnamese students were killed in school fights during the 2013–2014 school year. However, technological applications in Vietnam are not as popular as in developed countries. Moreover, funding for schools in Vietnam remains limited; hence investing in CCTV requires considerable acceptance from educational stakeholders. Finally, as an Asian country, Vietnamese people's perceptions of privacy may differ from those of Western countries.

Another gap in the literature is that while much research has examined the perceived effectiveness of CCTV, there is little research on the acceptance and adoption of CCTV in solving school violence in Vietnam. To fill this literature gap, this study undertakes qualitative research to examine educational stakeholders' perceptions of privacy, resistance and transparency concerns, and the factors influencing their acceptance of installing CCTV systems. Understanding the expectations and concerns of different groups of stakeholders can provide content-rich insights for educators and policymakers before installing CCTVs. Since this research does not verify the effectiveness of CCTV, it explores how people perceive the effectiveness of CCTV in decreasing school violence, it will inform decision-makers of the expectations of stakeholders on CCTV and potential weaknesses in the system to avoid their resistance due to their concerns. Therefore, this research examines the following questions:

1. What factors influence stakeholders' acceptance of installing CCTV systems in Vietnamese schools?
2. How do stakeholders in Vietnam perceive the effectiveness of CCTV in reducing school violence?
3. Are the privacy and resistance concerns considered to be major factors to evaluate the necessity of CCTV like in the developed countries?

## 2. Literature review

### 2.1. CCTV application in education: a double-edged sword

Research on the application of CCTV to combat school violence dates back to the mid twentieth century (Barrington, 1965). Since its introduction into the educational context, many schools, especially in the United States (US), have increased the use of surveillance systems such as cameras and metal detectors for the main purpose of reducing crime and violence, as indicated by approximately 89% of schools adopting them (Zhang et al., 2016). When CCTV surveillance was first adopted in schools, its original intention was to protect members from intruders and to increase security. However, there has been a transformation in the way CCTV is used: from preventing external intrusion to internal observation and monitoring (Norris & Armstrong, 1999). Currently, this technology is one of the most common methods for controlling school crimes and violence (Fisher et al., 2021). It has also been argued that there has been an increase in classroom misconduct (Sun and Shek, 2012), so there must be evidence to punish and admonish people whenever they are exposed to wrongdoings. The adoption of CCTV plays a role in storing and producing evidence for a fair evaluation of misconduct, thus controlling the behaviors of both teachers and students and encouraging students to control their minor disciplinary violations, and increasing self-surveillance as people are aware of being subjected to observation (Birnhack and Perry-Hazan, 2020). Additionally, CCTV is deemed to reduce labor costs and increase the effectiveness of student supervision (Manolev et al., 2019).

Regardless of the benefits, the implementation of CCTV creates a trade-off between security and privacy (Birnhack and Perry-Hazan, 2020). For instance, some scholars regard CCTV as a reason for the decrease in the perception of safety, equity, support, and a sense of belonging within the school (Lindstrom Johnson et al., 2018). Moreover, many students are concerned that CCTV would intrude on their privacy, which is an individual's basic right, and be reviewed as an expression of mistrust or a driver of resistance (Horton, 2012; Taylor, 2010). Some scholars have further stated that CCTV may shift from a focus on behavioral education to crime detection and punishment, thereby

creating a punitive environment (Fisher et al., 2020). In this sense, empirical evidence shows that CCTV may have no effect or relocate crime or even increase crime in different contexts (Cerezo, 2013; McLean et al., 2013); thus, raising the question of whether CCTV should be installed or how CCTV should be managed in the education sector.

## 2.2. The installation of CCTV in Vietnam

Empirical research has shown that school context affects the use of school security measures (Fisher et al., 2020), and understanding how context can influence the acceptance of security measures helps school management teams monitor school violence more effectively (Benoliel, 2020). It is not only the 'setting,' but also the disciplinary structure that promotes school violence (Horton, 2016). However, analysis of school surveillance in recent years has been dominated by Western-centric research while leaving a large gap in the developing context. Furthermore, to the best of our knowledge, no previous research on CCTV in Vietnam has concentrated on schooling and high school campuses. This study is the first attempt to fill this gap by investigating the use of CCTV in Vietnamese schools, particularly in school violence control. The first step in this process is to provide a socio-historical perspective of schooling in Vietnam to understand the context of surveillance practices and school discipline culture, while identifying the differences from Western-centric research.

The difference in the perception of privacy between Vietnamese and Western countries creates the need to study CCTV in Vietnam. Privacy and individualism have been emphasized as the main arguments against school surveillance in most Western-centric studies (Birnback and Perry-Hazan, 2020). However, this perception towards privacy as a fundamental right, an inviolable component of one's identity, is not appreciated in Vietnam. Research has suggested that Vietnamese people are unconcerned about surveillance, including the gathering of their personal data and the importance of consent (Cao et al., 2020; Maj, 2013). They feel safe with public surveillance without knowing the time, place, and person in charge of the monitoring. This study highlights this conflict by setting contexts in which to study the acceptance of Vietnamese schools.

The second difference is resistance to school surveillance. Michel Foucault's theory of surveillance centers on the execution and maintenance of power. It has been stated that where power exists, resistance also emerges (Foucault, 1995). Similarly for school surveillance, the school's disciplinary power also elevates resistance practice, in the form of evasion and dissent, such as twisting, hindering, and covering (Birnback et al., 2018; Carlile, 2018). Therefore, researching CCTV in Vietnam requires investigating Vietnamese schools' power relations and resistance practices (Horton, 2016). Specifically, Vietnamese schools have been strongly affected by power dynamics (conformity habits) and collectivism (emphasis on community harmony rather than individual pursuits). Very few students question school authorities or report school bullying (Pells et al., 2016). Moreover, the school administration followed the same trend of keeping silent and ignoring conflict. This practice is partly derived from Confucianism which values deference and status hierarchies from a cultural perspective, and also from the purpose of maintaining the authority standing of the single-party state from a political perspective (Hallinger, 2018). This gap in schooling culture might affect the usage and acceptance of CCTV, where power relations and resistance practices often need to be considered (Horton, 2016).

## 2.3. The technology acceptance model for video surveillance (TAM-VS)

To understand the adoption of video surveillance, a previous study recommended the technology acceptance model (TAM) (Liu et al., 2010). This model has played an integral role in technology adoption contributing to the development of many fields ranging from health care to education, such as research on US mobile payment transactions or wearable equipment in health care services (Bailey et al., 2017; Cheung

et al., 2019). Notably, the TAM has also borne testimony to the ability to evaluate students' and teachers' perceptions of adopting technology in the education system (Scherer et al., 2019). Therefore, the usefulness of the TAM is inevitable in technology adoption.

This study followed the modified version of the TAM-VS proposed by Krempel and Beyerer (2014). A detailed explanation is that TAM-VS was elaborated and refined from TAM so that the adoption of TAM-VS is more beneficial and relevant for the research of surveillance systems. The TAM-VS model consists of 5 main variables: Perceived Usefulness (PUS), Perceived Personal Risk (RI), Transparency (TR), Emotional Attitude (EE), and Acceptance (AC). PUS investigates the significance and benefits of the entire system in solving the remaining problems in a particular context. RI is the perception of the risks associated with using a surveillance system ranging from managing the system to utilizing it for irrelevant purposes. TR signifies people's understanding of the system work process, which begins when the cameras monitor users and ends when data are collected for administration. EE generalizes RI and TS to examine optimism or pessimism, and vice versa once users have experienced a surveillance system. AC is derived from EE and PUS to determine the possibility of users accepting the technology. Moreover, there is an addition of another factor, which is a Necessity - the "last resort" principle (Ohlin & May, 2016). This criterion includes cost and comparison of surveillance systems with traditional methods to examine the necessary level of such technology.

## 3. Methodology

### 3.1. Study design

To the best of our knowledge, the authors could not find studies addressing how students and teachers in Vietnam perceive CCTV in preventing school violence using Scopus and Clarivate databases. This literature gap has motivated us to adopt a phenomenological study design to explore the preliminary themes and factors that may influence CCTV adoption in the Vietnamese educational context. Our design study uses Phenomenology (qualitative method) to explore stakeholders' subjective experiences related to the adoption of CCTV. This study design is suitable for the research question because subjective and multiple perspectives allow us to construct a phenomenon more comprehensively. Specifically, the authors selected in-depth and semi-structured interviews as a means of data collection because they allowed the authors to investigate interviewees, attitudes, expectations, and concerns toward the implementation of new technologies. These interviews also promoted two-way communication and allowed interviewees to share novel perspectives and information that the researchers had not previously accounted for. We further utilized thematic analysis as a data analysis technique because it provides a framework for organizing content-rich data rigorously and robustly (Oppong et al., 2020). Finally, the study follows the Consolidated Criteria for Reporting Qualitative Studies (COREQ) guidelines to deliver the study rigorously and transparently (Tong et al., 2007). Appendix 1 summarizes our method in 3 sections: (1) research team and reflexivity, (2) study design, and (3) data analysis and reporting.

### 3.2. Participants, settings, and sampling procedures

Students and educators (teachers and administrators) are the two major stakeholders in anti-school violence; thus, the inclusion criteria for participation were high school students, teachers, and administrators in Vietnam. These stakeholders were selected because CCTV monitoring would directly affect their educational activities at schools in both positive and negative instances, such as preventing school violence and violating their privacy. Each participating stakeholder also plays an important role in preventing violence. For instance, while students have the potential to participate in bully victim relationships, educators have the authority to request or reject CCTV measures in their schools. We also

interviewed recent high school graduate students for no more than 12 months because they still held a detailed recount of their experiences with CCTV and violence in the previous year. Participants were separated into two groups: students (current and recent high school graduates) and educators (teachers and administrators). This categorization allows researchers to understand and compare the demands and challenges of each group when implementing CCTV. By comparing and aligning requests from each group, this study provides insights into how CCTV should be used to combat school violence in Vietnam.

To ensure that all important groups were represented in the data sample, a sample plan was constructed based on participants' positions in Vietnamese high schools. The author then recruited the participants via a purposeful sampling technique because this non-probability sampling is the most effective when one needs to study a certain cultural domain with knowledgeable stakeholders. As this study aims to explore factors that might influence CCTV adoption from each stakeholder in the school-violence context rather than finding a generalization of such knowledge, purposeful sampling provides credible and high-quality results because the authors can ensure the relevance, reliability, and competence of the participants (Palinkas et al., 2015). Finally, this study followed the saturation rule suggested by Saunders et al. (2018) to determine sample size. Under this rule, data saturation is achieved when no new information is derived from new interviewees, and it allows the authors to identify all major and minor themes related to the research questions, ensuring that the explorative study can provide the most comprehensive results.

### 3.3. Data collection and instrumentation

The pilot study was conducted from July 1st to August 15, 2021 with 3 students and 3 educators to identify whether the question guide, which is based on TAM-VS theory, is unambiguous and culturally appropriate for Vietnamese participants and can generate data on the perception of stakeholders on CCTV adoption. The authors also consulted one senior researcher and one industry expert, specializing in technology adoption and education, to validate the question guide (Appendix 2). The main data collection period was August 28 to September 19, 2021. The researchers who participated in the interviews were D-M.T, T-L.P, N-L.P, H-M.T. This interview team consisted of 4 female research assistants who participated in the qualitative and interview courses.

In this research, we employed Pew Research Center, an American think tank on the demographic categorization of aged groups: Generation X (1965–1980), Generation Y (1981–1996) and Generation Z (1997–2012) (Dimock, 2019). Regarding Generation Z, only participants over 16 years old were selected to comply with the Vietnamese Children Law 2016. Using purposive sampling, we distributed the interview request on social media platforms, namely Facebook, on the researchers' accounts in a public setting. We also posted on various Facebook groups of high schools communities and teacher communities to recruit more respondents that fit the inclusion criteria. Due to the Covid-19 pandemic, researchers conducted all interviews via Zoom or telephone. The sessions were conducted in Vietnamese. 48 participants were recruited through mobile phones or social media; however, 2 participants later declined to participate due to personal circumstance. Following the saturation rule, while the data were saturated after 35 participants, the researchers continued to conduct additional interviews to confirm the saturation of each group. The data collection ended with Participant 46 because no novel and significant information was collected from the additional interviews. This small number of participants is suitable for qualitative research (Creswell, 2013). Sociodemographic characteristics of the participants are presented in Table 1.

Before the interviews, the researchers asked the participants to complete an anonymous demographic survey via Qualtric to gather information about their occupation, educational attainment, school location, type of school, knowledge of CCTV, and perception towards school violence. The participants provided consent to participate in the study

**Table 1.** Socio-demographic characteristics of participants.

Sociodemographic Characteristics		N (%)
Gender	Male	14 (30.4)
	Female	32 (69.6)
Age	Generation Z	29 (63)
	Generation Y	13 (28.3)
	Generation X	4 (8.7)
Occupation	Student	29 (63)
	Teacher	17 (37)
Highest Educational attainment	In high school	21 (45.7)
	Graduate from high school	7 (17.4)
	Graduate from university	9 (19.5)
	Postgraduate	8 (17.4)
School location	City	32 (69.6)
	Suburb	5 (10.9)
	Countryside	9 (19.6)
Knowledge about CCTV	Use CCTV on a regular basis	33 (71.7)
	Have heard about CCTV but never used it	13 (28.3)
Perception towards school violence	Have heard and self-learned about violence on the Internet	39 (84.8)
	Have been trained against violence	7 (15.2)
Type of school	Private	1
	Public Gifted school	4
	Public Non-gifted school	13

and allowed the researchers to publish anonymous data from their conversations with the interviewees. Each interview session consisted of three sections. First, the researchers introduced themselves, their research goals, and asked them to record their permission. While the researchers recorded all sessions in written form, audio recordings were available when the participants were permitted. If the participants had questions regarding the study or needed to define important concepts, the researchers clarified them in the first session. The second section followed the question guidelines (Appendix 2) to explore the adoption behaviors of students' and educators' regarding the perceived benefits and risks of CCTV technology. The third section provides an open discussion between the researchers and participants regarding research topics. This section allows researchers to identify new variables and perspectives that were not anticipated by the question guide and to reconstruct the question guide. Before the session ended, the researchers showed the participants notes. This process allowed the participants to confirm whether the recorded information reflected their thoughts, aiming to avoid misunderstandings between participants and reviewers during the noting process. The interviews lasted from 45 min to 90 min, and there were no field notes or repeat interviews.

### 3.4. Data analysis

Thematic analysis followed the procedure established by (Braun and Clarke, 2006), visualized via Figure 1. All researchers participated in the coding process. While all researchers have learned thematic coding, T.N. and K.T. have further qualitative research publications. First, the researchers transcribed the data from Vietnamese into English and familiarized themselves with the content through repetitive reading and listening. Second, the researchers developed an initial code and categorized similar codes into themes. This process results in a coding tree with a description for each code. When new codes emerged, the researchers collaborated and discussed with each other to create new coding tree nodes or redefine the current themes. This step was repeated until no new code emerged from the collected data. The results contained four main themes: Effectiveness, Personal risks, Transparency, and Necessity (see Appendix 3). While our study was based on TAM-VS, we excluded the Emotional Attitude factors because the respondents only mentioned them



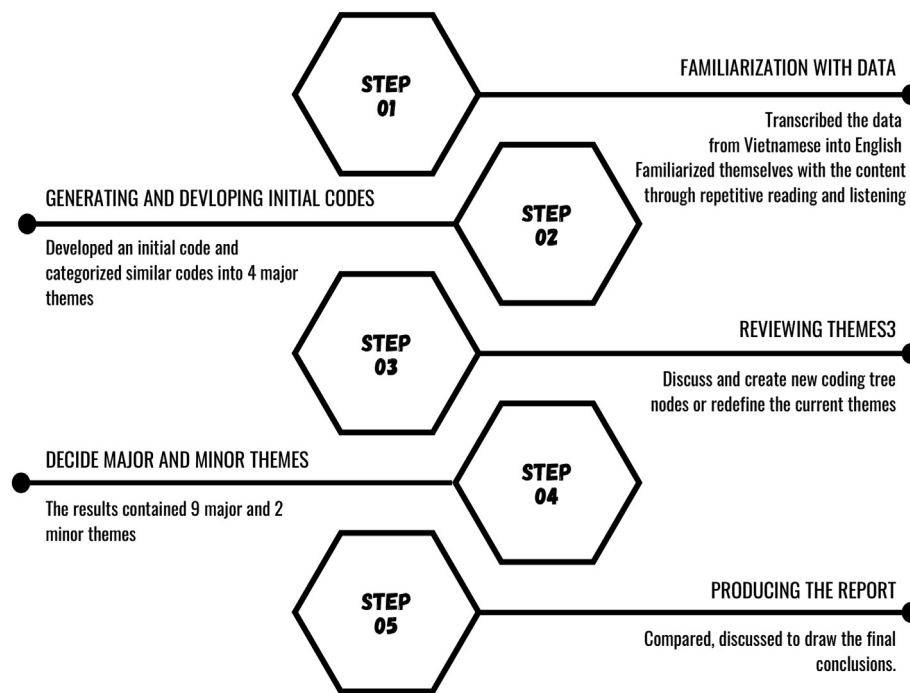


Figure 1. Diagram for Thematic Analysis developed by Braun and Clarke (2006).

briefly; if the interviewers did not ask, the participants did not even mention this information. Among all major themes, the researchers identify sub-themes via sub-codes. In Effectiveness, we identified self-discipline promotion, evidence of misbehaviour, and resistance practice as the main sub-themes. In Personal risks, participants frequently mention "Privacy & Autonomy" and "Inequality & Discrimination," while only less than five participants say "Trust" or "Function creep" as their concerns. Regarding Transparency, students and teachers are concerned mostly with two sub-codes, "Consent and acknowledgement of instalment and usage policy" and "Adjustment of usage policy. Finally, we have Necessity as a modification for the TAM-VS model with two sub-codes cost-effectiveness and comparison to alternative security methods. With each theme and sub-theme, the coders attributed one to two quotations from the participants to ensure an authentic analysis. Finally, to ensure consistency and validity, all the researchers performed a separate analysis of the themes (effectiveness, perceived risks, transparency, and necessity) that were compared and discussed to draw the final conclusions.

## 4. Results

### 4.1. Demographics of the interview participants

Table 1 shows that our sample represents stakeholders from diverse backgrounds in terms of geographical location, age, educational attainment, awareness of school violence and CCTV. The diversity in participants' backgrounds ensured the comprehensiveness of the collected data as participants with different contexts have different experiences with CCTV and violence. However, there was a potential bias that could have affected the results of this study. First, nearly 70% of the participants lived in cities with better conditions for the application of surveillance systems and fewer violence cases. Hence, they are exposed to CCTV on a more regular basis to provide a more experienced response; however, a considerable bias is that most of them did not realize the optimal use of CCTV in violence prevention. Second, most interviewers were female; however, the statistical analysis revealed almost no difference between the responses of the two sexes.

### 4.2. Effectiveness

First, the introduction of school security had a significant impact on Vietnamese students' self-discipline, especially when they were aware of modifying their unacceptable behaviors and aggressive actions. On the one hand, half of the interviewees consider CCTV as a temporary measure in the school context. The main reason is that CCTV helps restrain violence in the sight of CCTV, but students may resist it by relocating to bullying, mainly outside of school. On the other hand, the other half argued that self-awareness can foster desirable behaviors in the long term because it is hardly possible for them to pretend over three or four years, as one interviewee said:

"It can help us create the habit of having a second thought before doing anything."

However, all participants believed that the emergence of CCTV in schools could raise awareness and bring more attention to the issue irrespective of its short - or long-term effects on students' misbehavior correction.

Moreover, CCTV provides objective evidence for students' fighting and criminal activities to promote equality in judgment. One interviewee said that "Vietnamese people usually rely on perceptual skills to assess the problems, so CCTV is a powerful tool to make the judgment more transparent." When asked about the reliability of the evidence, most interviewees stated that they felt secure for two main reasons (1) the slight likelihood of mistakes and (2) the consequences can be controlled and reversed. As a student said:

"Students and teachers have limited power and knowledge to influence CCTV, and even if it happens, the advance in technology can easily detect it."

However, in the interviews, two educators asserted that presenting images of students' misbehavior in the investigation is tantamount to lowering students' self-esteem in the future. In terms of emergency cases, this function of CCTV is defined in the Vietnamese context to allow educators to intervene immediately when fighting or bullying victimization occurs. Almost all interviewees believed that this would be difficult unless these schools had specific observers and IT groups.

Owing to intermittent supervision and limited ability to manage digital devices, most Vietnamese schools currently can not maximize the function of CCTV.

Another important factor to consider when examining CCTV's effectiveness is resistance. The results show that on campus, resistance is expressed in two forms: evasion and dissent. First, most interviewees stated that students could avoid CCTV by taking advantage of the blind spots. However, half of the interviewees said that it is unlikely to affect the effectiveness of CCTV for two main reasons (1) detecting the action quickly due to the small size of Vietnamese schools; and (2) the combination with other methods, namely witness statements and an increasing number of school security guards in these out-of-sight and sensitive areas. Regarding the dissent practice, some dissent actions noticed in the interview were mostly twisting and covering, but unlikely hindering due to financial consequences; some dissent towards the school was disrespectful and rebellious. However, almost all interviews stated that the frequency of these dissent actions was insignificant because of obedience to authority, as stated by one interviewee:

"As one gets admitted to an educational institution, students have to observe the proprieties, which means stringent adherence to all school's regulations and decisions."

#### 4.3. Personal risks and transparency

Privacy is the right to take action without worrying about being monitored, whereas autonomy is the right to make decisions without being affected by others. These factors play vital roles in the acceptance of CCTV systems. Among the respondents, there were two conflicting opinions regarding privacy when using CCTV systems. On one hand, people think that the right to do something without being monitored is essential. However, privacy issues were not largely considered in this study. Few people asserted that some loving couples can be annoyed as their actions are recorded, and another reason is that several gestures for fun can be reported to make educators misleading. Additionally, the appearance of CCTV systems may prevent students from speaking out in class and affect the quality of their lessons. By contrast, all teachers and the remaining students believed that this did not affect their privacy. The main reason for the agreement is that school is a public location where people should follow moral standards: "School is a public environment with moral standards that people should behave according to there." Therefore, they concluded that it is the norm to equip CCTV systems at schools. In addition, although some people worry about privacy and autonomy, they still trade off it for the effectiveness of this system, which is the most common reason for mutual benefit. Educators believe in the effectiveness of these systems and emphasize school transparency, but the nominal rate of students to be free.

Regarding the installation of CCTV in classes, most interviewees stated that the camera system made interaction among students and teachers more uncomfortable, but they still encouraged the use of CCTV in class because it somewhat reduced the violence. In terms of installing CCTV in sensitive spots like at the door or places nearby WCs, most interviewees believed "CCTV must appear in those places, so long as not directly monitored inside the toilets" because of a high potential of school violence. There was also some concern that "CCTV in such sensitive areas might affect privacy and create risks," so they opposed the use of CCTV in these places. This belief is related to transparency. Half of them stated that the cameras would be effective if designed appropriately, and the function creep rate could decrease. Therefore, although privacy is vital to the interviewees to some extent, they believe that the benefits of CCTV installation in class and WC location outweigh the consequences.

Inequality and discrimination were repeated during interviews. In the school context, inequality is the decision of administration to be unfair, and discrimination is the act of mistreating people due to particular reasons and prejudices ranging from achievement at school to physical appearance, ethics, and sexual orientation. To exemplify how stereotypes

affect punishment, researchers ask participants whether the perception of dying hairs, tattooing, or ethical background may single out certain groups of people. While there are a few people who support the idea that discrimination can happen at school, as an interviewee said:

"Some teachers in Vietnam can have conventional assumptions. Therefore, it can happen frequently."

They explained that the judgment could be biased since some people hold conventional thoughts about the style that is not appropriate for students or that impressions of students can affect this. However, most interviewees answered that this was due to systemic administration and unmistakable evidence. There are enough people involved in the judgment to ensure that it can not happen. On the other hand, nearly half of the interviewees agreed on sorting out students with rebellion and misbehaviors to better manage and educate them.

Most interviewees stated that they should have the right to contribute to the school's CCTV policy. However, there is a divergence in the level of rights given to the students. On the one hand, one-third of the interviewees stated that they should be given equal rights, which means equal rights to adjust usage policies that do not fit into their benefits or preferences, mainly through the voting procedure. This is because equality is essential to them, and they can mutually contribute to the school environment. On the other hand, two-thirds of the interviews stated that schools should hold the final and supreme power of policy adjustment, after considering suggestions or objections thoroughly, since it would be (1) difficult to control diverse ideas; and (2) likely that power would easily be abused by the students.

#### 4.4. Necessity

The cost defined in the Vietnamese context is the installation, monitoring, and maintenance costs, included in the annual payment for school facilities, paid by either students' parents, government, or the school itself. The necessity defined in this context refers to the extent to which the effectiveness justifies the cost of CCTV. Through the interview, the main reason that justifies the cost of CCTV is their effectiveness. As one interviewee said: "It is truly worth the financial cost of CCTV because the cost for the victims is much higher." When asked if their parents are the one who pays for CCTV but not the schools themselves, about half of the students stated that they were willing to afford a low-middle price range. However, many interviewees stated that CCTV should not only be installed for school violence but should be utilized for other purposes, especially teachers who would link CCTV's effectiveness to improve quality management.

When asked if the additional installation of CCTV is essential despite the existing methods, almost all participants stated that it was worth installing. They pointed out that the existing methods are (1) not good/(2) good but inadequate. For the first reason, many stated that human-driven methods are "unauthentic and unobjective" or "teachers, personnel could be the bullies too." For the second one, every method has limits, and humans can not control for 100% of the time, so CCTV would play an essential supporting function, therefore minimizing school violence cases.

In summary, there are three primary criteria for evaluating the necessity of CCTV: (1) whether CCTV is effective in controlling school violence; (2) CCTV can be utilized for other purposes to enhance overall performance; and (3) the existing methods are not effective or effective but inadequate. Notably, when it comes to evaluating necessity, teachers tend to think CCTV is unnecessary more than students do, mainly because they think the school violence situation is not so urgent: "if that school's violence rate or the overall environment is acceptable, then installing CCTV is not so necessary."

## 5. Discussions

To the researchers' knowledge, this research is considered to be the first one that rigorously explores the relationship between effectiveness,

risks, transparency and necessity of CCTV and Vietnamese highschool students and teachers attitudes on surveillance system. Although there have been a few research on this in the other countries, especially in Western ones, the researchers believe the difference in socio-economic status and violence rate of Vietnamese highschool would cause a distinction in the results.

In-depth interviews with stakeholders in education highlight their perception of the necessity, effectiveness, privacy, and risks of CCTV technology in the context of Vietnam. However, it illustrates the potential trends, demands, and concerns worth the notice of educators, policy-makers, and CCTV business services. First, the research compares the motivations and perceptions of educators and students to find the similarities and differences between the groups. While both groups are aware of the use of CCTV, teachers are less concerned about violence and have fewer demands on CCTV than students, as they believe the problem has not been so urgent, which contrasts with the findings of [Birnhack and Perry-Hazan \(2020\)](#). Understanding the gap between educators' and students' perceptions can mitigate the resistance practice and problematic behaviors of students; thus, there could be some proposals to improve the practicability of CCTV at school and increase the overall effectiveness of CCTV. Additionally, while in nature, a qualitative study does not have a sufficient sample size to generalize knowledge and demand to represent the total population significantly, as the number of interviewees living in the countryside and suburb was much smaller than that in the city (14 and 32, respectively). This gap would make the results biased since students living in cities would have a better approach to technology, or CCTV more specifically, and higher socioeconomic status. Moreover, students also outnumbered the educators in this interview (29 and 17, respectively), and it would be more neutral if these two groups had been equal in size. In future research, scholars can use the TAM-VS model to conduct Multi-group Analysis (MGA) using Partial least squares structural equation modeling (PLS-SEM) to confirm the similarities and differences between the groups and rigorously test the relationships between the variables in the model.

Second, the data show that the stakeholders believe that the benefits of CCTV overshadow the potential risks and costs of the application. They also suggest that this technology is worth installing to prevent possible violence and misconduct, showing the demands of educators and students in preventing school violence and CCTV application. The reasons for the stakeholders to demand CCTV are similar to the findings of [Hope \(2009\)](#) and [Birnhack and Perry-Hazan \(2020\)](#), namely preventing school violence, promoting the habit of self-discipline for students, and quality supervision for teachers. In future research and innovation, engineers and researchers can develop and improve the features of CCTV that can fulfill these demands to ensure the marketability of the products and support the overall safety of students and education delivery. However, the overall demand for CCTV may be largely interfered by stakeholders' preference to utilize CCTV for other purposes beside school violence prevention, such as learning quality management and minor misconduct control, such as exam fraud, property loss. This finding suggests more investigations on this interfering relationship between CCTV and other educational aspects. Moreover, despite of the growing demand, stakeholders are only willing to pursue a low-middle price CCTV system rather than an expensive and comprehensive system. Hence, CCTV firms should be mindful of the financial constraints and customers' willingness. In our research, we just generally figured out that how much students have to pay for CCTV system at school has an effect on their decision to adopt CCTV, but fail to survey at which price, on average, would students find this system acceptable. Future quantitative research should investigate the influence of different price levels on CCTV purchasing intention or statistically verify the demands of stakeholders on CCTV.

Although the perception of effectiveness or ineffectiveness cannot translate into the actual effectiveness of CCTV methods, it can still illustrate the expectations of customers on CCTV and potential weaknesses in the system. First, the study observes that nearly half of the participants believe that the self-discipline of the student will only shift

temporarily, which has been acknowledged in the study of [McLean et al. \(2013\)](#) and [Welsh and Farrington \(2009\)](#) beyond the educational context. The study also suggests that potential weaknesses of the system, such as not preventing out-of-school bullying, or the avoidance practice of students, prevent the school from supervising all of the campuses. This result confirms the findings of [McLean et al. \(2013\)](#), [Cerezo \(2013\)](#), and [Horton \(2012\)](#). As the weaknesses of the current CCTV are similar to the findings over ten years ago, it highlights that the current investment and technological development of CCTV are not sufficient or not specialized enough to support the needs of the education industry. It may also highlight that relying solely on CCTV technology is not sufficient to ensure the safety of students and create a malpractice-free campus. However, this research highlight an implication to utilize CCTV usage in a different approach, which has been indicated in the result as "creating a long-term habit and awareness towards school violence" effect. Therefore, schools should also associate CCTV systems with other methods, especially reinforcement learning on habit and awareness of students.

Regarding the question of perceived privacy, Vietnamese stakeholders do not see the threat to privacy as a central issue, conflicting with the studies in Western countries ([Birnhack and Perry-Hazan, 2020](#); [Taylor, 2010](#)). However, the stakeholders demand some requirements to be fulfilled before installing the CCTV system, such as half of the respondents demanding consent or prohibiting CCTV insensitive and personal spaces such as restrooms. They also stressed the importance of highly efficient CCTV usage in these violence-alarming locations, since many stakeholders only choose to trade their privacy off for effectiveness. The stakeholders also demand that the institution has established and informed policies about the use of CCTV to prevent misconduct. Hence, although the standards of perceived privacy risks in the Vietnamese context are not as high as in Western countries, there are still requirements that schools and CCTV operators must comply with. Another note is that more Vietnamese, especially youth, demand a higher standard of privacy. Future research can investigate the ethical challenges in implementing CCTV in Vietnam and develop operation guidelines that mitigate stakeholders' concerns.

Similarly, the findings on resistance practice also confirm hypotheses on Vietnamese conformity to authority ([Hallinger, 2018](#)). It is witnessed in the result that Vietnamese students' resistance practices including evasion and dissent do not highly affect the effectiveness of CCTV, largely because of their perceived trust in school security management or obedience to schools' rules and properties. The same attitude is also shown in students' trust in school's supervision of CCTV evidence, and obedience towards discriminative risks from schools' governing power. The student believes that if the school had a more robust procedure when accessing the CCTV footage and shared the right to decide the policy with the student body, they would have less resistance to the school.

Additionally, there are two minor themes briefly mentioned by the participants; however, the authors do not report this because of the low intensity of the code. Still, their answers spark some contrast with the literature that should be investigated in future studies in Vietnam. First, although previous research shows that school surveillance decreases trust, support, and sense of belonging between students and teachers, and CCTV negatively affects the school climate ([Birnhack and Perry-Hazan, 2020](#)), many interviewers do not perceive that CCTV can cause these consequences. They also do not think function creep or the abuse of CCTV systems for irrelevant purposes, such as personal information leaks to outsiders, to be a significant issue. However, because these themes were not highly touched by the participants without guiding questions from the interviewers, this information might not be generalizable. Therefore, future research should be carried on a larger scale and in quantitative manners so that the number of interviewees would be high enough to confirm the impact of CCTV on the trust of students and educators towards school administration, as well as provide better in-depth and empirical data to verify whether students concern with the function creep or misuse of CCTV or not.

By combining stakeholders' answers, the study suggests primary criteria for evaluating the necessity of CCTV in a particular school in Vietnam. Based on the mindset of cost-benefit analysis, the criteria revolve around three dimensions: (1) CCTV is effective in controlling school violence; (2) the existing methods are not effective or effective but inadequate; (3) whether CCTV can be utilized for other purposes to enhance overall performance. The study also acknowledges the strengths and weaknesses of CCTV systems and how the schools can combine these methods to optimize the security and safety of the campus. These criteria and suggestions can provide a simple guide for school managers to decide on the relationship between CCTV and other methods, as well as how to integrate CCTV effectively into their institutions' management systems. However, as this criterion and suggestions are only preliminary and based on stakeholders' perceptions, future research could modify and develop these criteria to establish a more comprehensive and data-driven framework for effective decision-making.

## 6. Conclusions

Based on the TAM-VS framework, this study explored the factors affecting the attitudes of different stakeholders at school. The three investigated antecedents are perceived effectiveness, emotional elements, namely privacy issues, and transparency concerns, and the necessity of CCTV. First, regarding effectiveness, both educators and students assert that CCTV could not address violence completely, because they believed that bullies could resist by changing the bullying locations. Hence, schools should combine CCTV with other methods to maximize their effectiveness. However, overall, they believed CCTV provided reliable evidence and its effectiveness was insignificantly reduced by the resistance practice, which not only minimized the rate of violence at school but also raised awareness of school bullying and the habit of self-discipline in the long term.

Second, regarding transparency, participants had conflicting opinions on how to improve transparency in CCTV management and implementation. On the one hand, half of the participants believed that better communication on policy, consent collection, and rights to amend school policy on CCTV played a key role in promoting their acceptance and trust in CCTV. The other half argued that it was unnecessary for schools to obtain complete consent from students and educators for the CCTV's installation and policy because it is undoable and time-consuming. Since schools are regarded as public places, and participants believed they did not do anything illegally at schools, it seemed that CCTV did not violate their privacy. Instead, they accepted the use of CCTV because of its effectiveness, which was worth the cost they paid for.

Finally, administrators can evaluate whether it is necessary to employ CCTV using three criteria: (1) its effectiveness in controlling school violence, (2) serving other purposes to enhance overall schooling performance, and (3) insufficient existing methods. In the Vietnamese context, the cost of renovating infrastructure includes the installation and fixing of CCTVs. It is believed that almost all students can afford the fees to maintain these systems in the long-term.

On theoretical implication, the research provides context-rich insights into the perceptions of the necessity, effectiveness, privacy, transparency, and risks of CCTV technology across different stakeholders in the educational context. By analyzing the responses with thematic analysis, the study also illustrates different perspectives and reasons that have given rise to the privacy-effectiveness conflicts and its potential mitigations. The research also addresses the contextual gap of developing countries and Vietnam proposed by the recent literature and empirical knowledge of CCTV. The study suggests future research directions to statistically verify the relationships between variables in TAM-VS and the cost and effectiveness of CCTV technology in the context of Vietnam and other developing countries.

With regard to practical implications, content-driven data also suggest future technological and policy development to address the demands and problems of stakeholders, such, the misuse of CCTV or the costs of

CCTV implementation and monitoring. Moreover, schools in Vietnam should develop comprehensive guidelines and provide training for security officers to understand their ethical duties and competence in operating CCTV systems. Schools should communicate these policies to students to ensure transparency. For schools that want to establish the system, gathering consent from students is a good practice to ensure the acceptance of the student body. These actions will increase the overall security of the schools and trust between students with educators. The research also set out three simple criteria for accessing the necessary CCTV systems on the campus, which aided the school managers in their decision on installing this surveillance system.

The study is not free of limitations. First, although the study has reached data collection saturation, which helps the author to explore the perceptions and concerns of different stakeholders comprehensively, the small sample size at 46 participants is not sufficient to generalize the finding into general populations. Future research can rigorously employ the SEM-PLS or CB-SEM technique to analyze the relationships between variables in the TAM-VS model. Second, the study offers different strategies to promote the effectiveness of CCTV in Vietnamese schools and strategies to reduce the stakeholders' privacy concerns. However, due to the qualitative nature, this study cannot compare the effectiveness of each strategy. Hence, future studies can employ longitudinal and cost-benefit analyses to compare these strategies in different situations or contexts to find the best options for Vietnamese educators. Finally, since this study only views the topic from the lens of the TAM-VS model, future research can employ other theoretical frameworks, such as the Unified theory of acceptance and use of technology or the influence costs on school purchase intention. These findings will give Vietnam educators and policymakers more comprehensive and data-driven information to aid their future decision-making.

## Declarations

### Author contribution statement

Khoa Tran, Tuyet Nguyen, Linh Phan, My Tran, Mai Trinh, Linh Pham: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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### Data availability statement

Data will be made available on request.

### Declaration of interest's statement

The authors declare no conflict of interest.

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