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Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

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Abstract

Cybercrime cost the Norwegian society NOK 19 billion in 2014 [1]. With continuous digitalisation occurring in Norway, it is essential to focus on information security for businesses, politicians, and citizens in general. Notably, proactive behaviour regarding information security can save society from massive expenses. To create good behaviour, it is essential that citizens learn about information security early in life. As such, schools in Norway are already tasked with teaching pupils about information security from primary school. A positive attitude towards this subject is favourable for behavioural change. Research has highlighted the benefits of using transactional analysis when teaching, as it has been shown to improve learning outcomes among students.

The present study utilised a design-based research methodology to teach pupils from the fifth and seventh grades about information security. Each class had a 90-minute session where they read three different interactive comics with a main character that had a specific ego state. The topics included password with an Adult ego state, unwanted incidents with a Parent ego state, and privacy with a Child ego state. The pupils answered a questionnaire before reading the comics, followed by additional questionnaires after reading each comic. This was performed to observe any potential differences between using comics and transactional analysis in educating students about information security. The results did not provide strong evidence of transactional analysis in comics being beneficial when teaching information security. The results indicated a more concrete attitude towards information security; however, a more negative attitude towards information security was observed overall.

Sammendrag

I 2014 kostet svak informasjonssikkerhet det norske samfunnet 19 milliarder kroner [1]. ID-tyveri, stjeling av bedriftshemmeligheter og løsepengevirus er noen av hendelsene som kan oppstå. Fokuset på informasjonssikkerhet øker med et stadig mer digitalisert samfunn. God oppførsel innen informasjonssikkerhet kan spare samfunnet for milliarder. For å skape god oppførsel er det viktig å starte opplæring av informasjonssikkerhet tidlig. En positiv holdning for et emne er en fordel når oppførsel skal forandres. En positiv holdning og bedre oppførsel innen informasjonssikkerhet kan oppstå ved at skoler nå er pålagt å undervise i informasjonssikkerhet i barneskolen. Forskning innen utdanning har vist positive resultater ved bruk av Transaksjonsanalyse i undervisningen. I disse studiene fikk elevene økt utbytte av undervisningen.

En studie med design-basert forskningsmetodikk ble gjort på elever i femte og sjuende klasse. Hver klasse hadde en 90 minutters økt hvor de først svarte på et spørreskjema, før de leste tre ulike, interaktive tegneserier med teori fra transaksjonsanalyse. Hver tegneserie hadde en hovedkarakter med en spesifikk ego state. Tegneseriene hadde emnene passord med Voksen ego state, uønskede hendelser med Forelder ego state, og personvern med Barn ego state. Elevene svarte på et spørreskjema etter hver tegneserie. Dette ble gjort for å avdekke potensielle forskjeller ved bruk av de forskjellige ego statene. Fordeler kunne så vurderes brukt videre i opplæring av informasjonssikkerhet hos elever. Resultatene ga ikke grunnlag for å konkludere om det var fordelaktig å bruke Transaksjonsanalyse i undervisningen. Resultatet viste en endring av holdningene hvor de ble klarere enn før elevene leste tegneseriene, skjønt holdningen gjennomsnittlig ble mer negativ.

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1 Introduction

1.1 Topic covered

There is a vague and uncertain situation regarding information security education in Norwegian primary schools. As such, there is a need for increased focus on information security education for younger pupils, which must become a high priority. Politicians and experts in Norwegian society are aware of this and want to make changes to education at the primary school level [2]. If pupils perceive the information security material optimally, the lectures would provide improved learning outcomes and become more time efficient.

Transactional analysis was presented in 1957 by Dr. Eric Berne [3]. From this point forward, transactional analysis will also be written as TA in this thesis. A vital part of TA is how people interact (have transactions) and three ego states; the Parent, the Adult, and the Child. TA explains that every human has these three ego states and that conflicts could arise depending on a person's ego state. Pupils' perceptions of information security material could thus be affected by the material's ego state and those of the pupils. The ego states are written as Parent, Adult, and Child in this thesis. In cases where an actual parent, adult, or child is mentioned, lower-case letters are used. Parent = Parent ego state, while parent = A person's father or mother [4].

Information security material that fits pupils' ego states could avoid conflicts in the transaction between the material and the pupil, resulting in the best possible education outcomes. This master's thesis study includes three different comics that implemented TA and its three ego states. The author created the comics. A study of how the pupils in primary schools perceived the material were then conducted to determine possible improvements for information security material for pupils.

The experiment was performed in different classes in the fifth and seventh grade, one class at a time. There was one session for each class, and each pupil read and interacted with the comics and answered questionnaires before and after each comic.

1.2 Keywords

Transactional analysis, information security awareness material, primary school, education, comics.

1.3 Problem description

The Norwegian Center for Information Security (NorSIS) and Norwegian politicians are some of those that consider digital knowledge among the Norwegian population to be too low [5]. On 30 January 2019, the Norwegian government launched a new national strategy for cybersecurity with several prioritised goals, including improved information security competence in the public [6]. One way to achieve this competence is to begin information security education early. In fact, according

to the internet resource *Du bestemmer*¹ (Eng: you decide), there are significant shortcomings in youths' knowledge regarding their privacy [7].

Currently, no data exists to verify the effectiveness of today's educational material. Could the pupils' personalities alter their perception of the material? Notably, "wrong" perception of educational information security materials might have negative consequences such as ineffective lectures. Negative consequences could also affect the pupils' interest in information security as well as their learning outcomes. While there are providers of educational information security awareness materials for primary schools in Norway, none of the materials are created with TA in mind. Therefore, the present study uses TA and its ego states in the creation of information security materials and to study if pupils' perceptions are affected by their personal characteristics. The materials target pupils from fifth and seventh grade in Norwegian primary schools and followed the required digital skills in Læreplanverket². Questionnaires were given to pupils for the evaluation of provided material.

1.4 Justification, motivation and benefits

The educational system in Norway is increasing its reliance on technology for teaching and learning. Norwegian schools have information and communications technology (ICT) equipment such as smart boards, laptops, and iPads, as well as software and applications for the various subjects taught. The use of technology is prioritised by the Norwegian government, who supports this development with measures including strategic and financial support. Schools can apply for financial support from the government to buy necessary software and equipment as a part of the Norwegian government Strategy of Digitalisation for Primary Education 2017 - 2021 [8]. Technology brings both advantages and disadvantages to these schools. While technology provides pupils and teachers with new possibilities in teaching and learning, new and unknown threats come with new technology. For example, it is possible that an iPad in first grade or a laptop in fifth grade could be a pupil's first significant experience with the responsibility and possibilities that come with having personal ICT equipment.

Comics have been used to convey curriculum with great success in previous research, as can be read in 2.4. Also, the use of transactional analysis in education has been successful, see 2.3. With interactive comics might the pupils get the benefits from both the use of comics and the use of transactional analysis. Three different, interactive information security educational comics were created. Each comic has its own story, with individual differences in text and drawing. The comics were adjusted according to the three ego states (Parent, Adult, and Child). There is a possibility that pupils perceive the material differently depending on the ego state of the comics. A study of potentially improved learning outcomes with comics and transactional analysis could result in data that can be used to enhance the material and tuition in information security. Such improvements might also result in an improved perception of the material, thereby leading to increased quality of tuition, increased interest from pupils, and pupils gaining more knowledge. Also, more effective

¹a project between the Norwegian Directorate for Education and Training, and The Norwegian Data Protection Authority

²Læreplanverket, which consist of regulations for the Education Act and are made by The Directorate for Education and Training

teaching lowers the required number of school hours for teaching the subject.

1.5 Research questions

This thesis will focus on the following research questions:

1. Do the ego states of educational material affect the perception of information security material by pupils?
2. Which ego state comic affects pupils' perception the most, and could it be used to improve information security material?
3. Is there a difference between the perception of web-based information security material in comic form and previously used material?

1.6 Structure of the thesis

- *Chapter 1: Introduction:*
A description of the topic covered in this thesis, the problem, and why this study was conducted.
- *Chapter 2: Background:*
A more in-depth explanation of the state of information security among pupils and the education they receive in Norway. Focus is placed on the three chosen topics: Password, Privacy, and Unwanted incidents. Examples from the comics with its main characters are presented at the end of the chapter. The chapter is further divided into sub-chapters that more closely analyse the use of transactional analysis and comics in education, as well as their use in the present thesis.
- *Chapter 3: Theory*
This chapter explains transactional analysis, the transactional analysis scale for the adjective checklist, and the attitude scales.
- *Chapter 4: Methodology*
A description of the strategies and the methodology used for collecting data are provided here.
- *Chapter 5: Tools*
Specific tools are used to create the information security material, make the material available for pupils, and collect and analyse the data. The programs and their functions are mentioned here.
- *Chapter 6: Results*
The results are listed in this chapter. Some results, like the pupil's perception of the comics and its main characters, are more critical and explained in greater detail than other results.
- *Chapter 7: Discussion*
The study's findings, limitations, uncertainties, and potential consequences are discussed here. This section includes the research questions and their outcomes.
- *Chapter 8: Conclusion*

Here, an overall conclusion of the thesis and its main points are provided. This chapter also includes suggestions for future work.

2 Background

Information security is a complex and extensive field that cannot be entirely covered in a single thesis. However, it is favourable to have some knowledge about its state and position in the Norwegian community and its primary schools before reading the remainder of the thesis. The words *negative trend* are used in this chapter. This does not imply that a percentage is decreasing, but rather implies that numbers are increasing in the case of a certain subject. For example, a negative trend occurs when pupils share more images without consent compared to previous years. Conversely, a positive trend would be if pupils share less images without consent.

2.1 The current information security state among pupils in Norway

Information security is not a standalone subject at primary school in Norway. While it is a part of the digital skills requirement, there are no grades assigned for these skills from the fifth to seventh grades. Moreover, unlike with math, reading, and English, there is no national test for these skills in Norway. Therefore, establishing pupils' skills and knowledge in information security remains difficult. However, there are examinations that provide an assessment of these skills. As previously mentioned, information security is an extensive field that cannot be covered in a single thesis alone. Therefore, this thesis focuses on the topics covered in the comics. The three comics are information security material for teaching pupils about the use passwords, the sharing of images, and unwanted incidents. The topics are discussed individually in their own subsections.

The "Barn og medier" (Eng: Child and media) examination is conducted every second year by the Norwegian Media Authority, with the 2018 edition being the newest [9]. Some comparisons between the statistics from the 2016 [10] and 2018 edition have been done. Most of these statistics indicate a negative trend that could be interpreted as information security education being inadequate, at least from a short-term perspective.

2.1.1 Passwords

There is an increasing trend of knowing one or more friends' social media passwords among pupils of all ages (9 - 11 years old, 12 - 14 years old, and 15 - 16 years old). Notably, the knowledge of other people's passwords has increased from 2016 to 2018 and increases with pupil age [9]. While focus on information security has increased in society and schools [11], the percentage of password sharing increased. One could assume that older pupils consider not sharing their passwords. However, a 2018 examination demonstrated otherwise, with the percentage of password sharing among boys ranging from 21 - 27% for the ages of 9 - 11 and 15 - 16, while the percentage among girls ranged from 17 - 43% in the same age range [9]. The 2016 examination showed the same trend for both boys and girls [10].

2.1.2 Sharing images and videos

An increasing percentage of both male and female pupils aged 9 - 16 years share images and videos without consent from whom it may concern [9]. In cases where consent is required, is it irrelevant whether or not the images and videos belong to those who share. The "Child and Media examination 2018" survey highlights that 99% of boys and 98% of girls have their own mobile phones by the age of 10. The same study also shows that, by the age of 10 for the boys and by the age of 11 for girls, over 90% have smartphones. The prevalence of smartphones with cameras and the introduction to social media with a strong focus on sharing with others could represent factors behind the increased number of pictures and videos being shared. Norway established a new Personal Data Act in 2018 stating that social media had to have a minimum age limit of 13 [12]. As with password sharing, the statistics for sharing without consent show a negative trend. The percentage of pupils that shared pictures or videos without consent has increased from 2016 to 2018 [9].

2.1.3 Unwanted incidents

Unwanted incidents can include several types of events. Some examples include digital bullying, sexual comments and images, and sharing images and videos without consent. Section 2.1.2 addresses the sharing of images and videos. Notably, the percentage of pupils experiencing hurtful, unpleasant, or threatening sexual comments online has decreased from 2016 to 2018 [9]. However, bullying, threatening, or the act of shutting somebody out from something online have exhibited smaller (both positive and negative) changes from 2016 to 2018. The act of shutting someone out occurs in online video games and chat groups, among others. An increased number of pupils have reported incidents of this occurring online, with the most significant increase being observed among the youngest group [9].

2.2 Information security awareness education in Norwegian primary schools

Information security awareness, called Digital Dømmekraft (Eng: Digital Judgement or digital literacy), is a part of the Digital Skills requirement from The Norwegian Directorate for Education and Training. Digital Skills is one of five basics skills that pupils shall learn [13]. This means that every pupil in a Norwegian school learns about topics such as privacy, sharing images and videos, and how to behave online, among others. A term used in some of the information security awareness educational material is "Nettvett" [7, 14]. Store Norske Leksikon (Eng: The great Norwegian encyclopedia) defines Nettvett as "Rules for behaviour and etiquette on the internet"¹ [15].

"Monitor skole" (Eng: Monitor school) is an examination that has been performed since 2003 to map Norwegian schools' digital state [16]. In 2010, there was a section about Nettvett, privacy, and digital bullying; however, there were no numbers or statistics included in this section of the report [17]. Notably, the 2013 examination did not have many statistics on these topics. The first examination including statistics and numbers on this topic was performed in 2016, and included a section named Sikkerhet (Eng: Safety) [16]. Due to a lack of relevant long-term statistics, it remains difficult to make conclusions regarding the state of information security knowledge education in

¹author's translation.

Norwegian schools.

2.2.1 Information security awareness material

Organisations such as Redd Barna (Eng: Save the Children), barnevakten (Eng: the babysitter), and du bestemmer (Eng: you decide) produce educational material for schools, kindergartens, and parents. This material consists of presentations, stories, discussion exercises, movies, posters, and comics. It is also possible to have representatives visit a school to hold a presentation for pupils, teachers, and parents. While the organisations offer varied and comprehensive material, interactive material remains currently unavailable.

2.3 The use of transactional analysis in education

The use of transactional analysis has been experimented with in education. The paper "The Use of Transactional Analysis with Inquiry Methods in Physics Teaching" by Fuller and Ward provided positive results by combining an inquiry approach to physics and transactional analysis [18]. The inquiry approach was used with elementary school science teaching methods. The students were introduced to the basic transactional analysis model in the first class periods. They improved their understanding of transactional analysis with discussions, assignments, and homework. Fuller and Ward developed a program to assist students in developing more positive attitudes about themselves and physics. The paper "Application of transactional analysis in ESL/EFL Listening and Speaking" by Hwang also included teaching students about transactional analysis [19]. This paper contains a specific dialogue, "A Holiday in Italy", which was adapted to fit each of the three ego states (Parent, Adult, and Child). Hwang stated that the modified versions "... offer students more freedom and opportunities in their expression of ideas (Adult state) or emotions (Parent or Child state), which may greatly reduce the boredom of exercising drills and promote students' motivation via the liveliness of various dialogue formats" [19, p. 5].

While the results of these studies have been positive and promising, the study presented in this thesis differs from those of the two aforementioned studies. This thesis does not include teaching transactional analysis to participants, and only involves the use of transactional analysis to teach information security.

2.4 The use of comics in education

An inadequate amount of research has been conducted on the use of interactive comics in education, particularly on the use of digital and non-digital comics in information security education. Notably, nearly all of the existing literature is focused on the use of non-digital comics in education.

Uncertainty exists regarding which comic was the first to be produced for educational purposes. Tribull mentions "The Cartoon Guide series" by Larry Gonick as one of the earliest [20]. Gonick's comic started with "The Cartoon Guide to Genetics", and he has now produced as many as ten different comics [21]. However, in his 1944 paper, Sones mentions that "The Superman Work Book" by Downes and Thorndike was the first comic introduced to classrooms [22].

Comics used for to convey information in education have been studied with both positive and

negative results according to their use in learning. The use of educational comics has shown potential benefits as a health information medium [23], in the pharmaceutical industry [24], in science [25], and in changing attitudes about biology in the courses Sensory Biology, Biology II, Organic Evolution, and Neurobiology [26]. However, researchers such as Caldwell hold largely negative views regarding information comic studies, stating that "Most supporters of the use of comics in education provide little or no data to support this conclusion", and that "Many studies can be criticised in methodology as well." [27, p. 5].

Srikwan & Jakobsson used the cartoon format to educate internet users in their paper "Using Cartoons to Teach Internet Security" [28]. They used the cartoon format "since it is accessible to a large portion of the population and allows the use of stories to illustrate complex processes" [28, p. 138]. They stated that internet security education has an inherent educational conflict, with complex education on one side and inappropriately simple education on the other. While showing and explaining problems to users could increase their knowledge, a change in behaviour is also necessary to achieve improved security. They stated that "It is often ignored that there is a tremendous discrepancy between what typical users know and what they practice" [28, p. 140]. Changing a person's behaviour often requires a good reason for the person in question to change. Warnings and instructions are therefore not sufficient for achieving this outcome. Thus, an explanation of the consequence(s) is required. As such, digital, interactive comics represent a good way to show the possible consequences of actions taken.

Zhang-Kennedy et al. used interactive comics to teach cybersecurity in the paper "The Role of Instructional Design in Persuasion: A Comics Approach for Improving Cybersecurity" [29]. Their on-line interactive comics were named "Secure Comics" and are available at <http://www.versipass.com/edusec>. The study used methods such as eye-tracking technology, and pre-, post-, prototype-, and post-test questionnaires. They stated that it is necessary to direct individuals' attention to educational material, and that they must maintain the learning state in order to acquire new knowledge. According to Zhang-Kennedy et al. this is required to ultimately achieve behavioural change. The paper cites several studies to demonstrate the benefits with the use of graphics and text, rather than text alone. Instructional design principles (later called ID principles) were followed in the creation of "Secure Comics". The use of ID principles are justified by the potential to reduce cognitive load, enhance comprehension, and increase long-term memory. Reduced cognitive load and enhanced comprehension for individuals also represent some of the positive results observed in the study. The possibility to interact with comics increased persuasion by displaying the benefits of certain security advice. Zhang-Kennedy et al. concluded that empirical evidence from the study "suggests that communicating the benefits of the advice is necessary to persuade users to change their behaviour" and that "embedding security training in an entertaining interactive comic series helped users overcome the difficulties associated with learning." [29, p. 240].

2.5 The use of comics and Transactional Analysis in the thesis

The information security education material used in the present study was originally created with transactional analysis in mind. As written in 2.4, a person requires an explanation of the conse-

quences for changing their behaviour. The use of comics alongside theory from 3.1.5 provides benefits and possibilities that can be used to improve learning outcomes for pupils. One way to improve communication from educational material to pupils is to use transactional analysis. Depending on the receivers' ego state, they could respond differently. This potential for varied responses relates to straight transactions and crossed transactions. The three different comics used different ego states for their characters. The Passord (Eng: Password) comic used the Adult ego state, the Uønskede hendelser (Eng: Unwanted incidents) comic used the Parent ego state, and the Personvern (Eng: Privacy) comic used the Child ego state. The comics were assessed by senior adviser Ivar Kjærem at NorSIS. He approved their theoretical content for educational use. From this point forward, the Passord comic will be called the Password comic, the Uønskede hendelser comic will be called the Unwanted Incidents comic, and the Personvern comic will be called the Privacy Comic. The Unwanted Incidents comic uses both the Critical- and Nurturing Parent part of Parent ego state, while the Privacy comic uses both the Free- and Adapted Child part of Child ego state. The little Professor ego state part is rarely mentioned in books and articles about transactional analysis compared to the Free and Adapted Child. This is why little Professor was decided to not be a part of this study (and the educational material). Results from the thesis "I'm ok, the material's not?" by the students Andersson and Windahl, shows that a teacher's ego state affects how the teacher perceives information security material [30]. There is a strong possibility that this scenario also applies to pupils. As such, this could increase the importance of having information security educational material that is well received by pupils.

A transactional analysis performed by the author on information security education material determined that the material had an Adult ego state. The material was from the organizations Save the Children, dubestemmer.no (you decide), and barnevakten.no (the babysitter), and was carried out with a list of words, phrases and descriptions of behaviour/adjectives describing the characteristics of the different ego states. The list of words, phrases, and descriptions originated from the following articles and books:

- "TA for Kids" [31],
- "I'm OK, you're OK" [32],
- "The use of transactional analysis with inquiry methods in physics teaching" [18],
- "Transactional analysis: A method of analyzing communication" [33],
- "The Development of a Transactional Analysis scale for the Adjective Check List" [34],
- "The assessment of transactional analysis ego states via the adjective checklist" [35],
- "The ego states and the "big five" personality factors" [36].

This list is not final, since more words, phrases, and behaviours/adjectives describing characters could fit the ego states. The three primary ego states (Parent, Adult, and Child) are used in this study. There are lists and descriptions of ego states in which Parent is divided into two states (Critical Parent and Nurturing Parent), or in which Child is divided into two states (e.g., Free Child and Adapted Child). These states are merged into Parent and Child where applicable. The complete list is presented in chapter C in the Appendix. Current material including an ego states could result

in crossed transactions if pupils respond in another ego state. Crossed transactions would result in broken communication, resulting in less effective information security education material and teaching. With the use of transactional analysis and ego states in the information security material, it is evident which ego state is the most effective for pupils in the fifth and seventh grade. This increases the possibility for improved learning outcomes, change of behaviour, and more effective teaching. The aforementioned list of words, phrases, and descriptions was also used to create the comics for this thesis. Examples from the three comics are provided in sections 2.5.1, 2.5.2, and 2.5.3 (one section per comic). Additional examples are provided in chapter B in the Appendix, .

2.5.1 Examples from the Password comic

Words and phrases:

- *Based on facts* in, Figure 1.

Conversation:

Heidi: "According to the book "Child online", trying the obtained password on other sites is one of the first things a hacker does."



Figure 1: Password comic. Word/phrase: Based on facts

Behaviour/adjectives:

- *Unemotional*, in Figure 2.

Conversation:

Heidi: "It's a risk for someone else to use your account for uploading images or writing ugly comments. You are responsible for your account."

2.5.2 Examples from the Unwanted Incidents comic

Words and phrases:

- *If were you*, in Figure 3.

Conversation:



Figure 2: Password comic. Behaviour: Unemotional

Nora is thinking: "What if I don't want to send more..."

Message on the computer from Lucas: "It is your choice, but I would have done it if I were you."



Figure 3: Unwanted Incidents comic comic. Word/phrase: If I were you

Behaviour/adjectives:

- *Supportive/helpful*, in Figure 4.

Conversation:

Headline: "Nora explains the situation to her mother".

Mother: "You have been great for asking for help in this situation. Trust me. We will work this out!"



Figure 4: Unwanted Incidents comic. Behaviour: Supportive/helpful

2.5.3 Examples from the Privacy comic

Words and phrases:

- *Things never go right for me*, in Figure 5.

Conversation:

Person to the left, Emil: "Do you think I messed up? It always becomes trouble when I do something."

Person to the right, Mathias: "He obviously thinks it wasn't funny..."

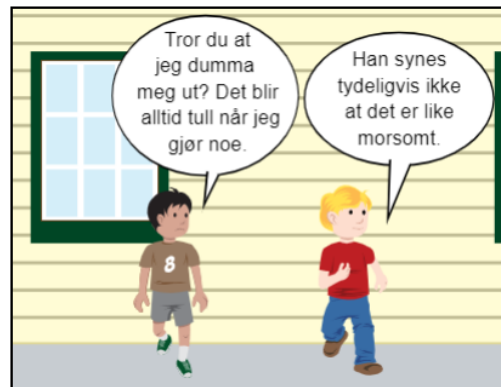


Figure 5: Privacy comic. Word/phrase: Things never go right for me

Behaviour/adjectives:

- *Enthusiastic*, in Figure 6.

Conversation:

Person to the right, Emil: "Yes! Consent! Let's do this!"



Figure 6: Privacy comic. Behaviour: Enthusiastic

3 Theory

3.1 Transactional Analysis

This section will introduce readers to the basics of transactional analysis. Psychiatrist, Dr. Eric Berne, is the founder of transactional analysis, "... the method for studying interactions between individuals" [37]. He observed how people changed when they talked. Dr. Berne was intrigued by questions like "what had changed inside them?" and "*from what to what* had they changed?" [32]. Transactional Analysis became a part of psychotherapeutic literature after his paper "Transactional Analysis: A New and Effective Method of Group Therapy" was published in the American Journal of Psychotherapy in 1958 [38]. In the book "Counseling Children" by Charles L. Thompson, it is explained that the theory of transactional analysis derives from four analyses [39]. These four types are:

- Structural analysis, in which an individual's personality is analysed.
- Transactional analysis, which is concerned with what people do and say to each other.
- Script analysis, which deals with the specific life dramas people compulsively enjoy.
- Game analysis, in which ulterior transactions leading to a payoff are analysed.

Notably, ego states are an important part of TA. These are described in the next subsection, though clarification is first required. The ego states are written as Parent, Adult, and Child in this thesis. In cases where an actual parent, adult, or child is mentioned, lower-case letters are used. Parent = Parent ego state, while parent = A person's father or mother [4].

3.1.1 Ego states

The concept of ego states suggests that each individual has different parts in their personalities. Notably, factors such as race, gender, age, etc., do not matter, since everyone has these factors. The three parts are the Parent, the Adult, and the Child ego states [40]. Stewart and Joines [41], cited in [42, p. 6], described an ego state as "a set of related thoughts, feelings, and behaviours in which part of an individual's personality is manifested at a given time." These are often presented as shown in Figure 7. We behave differently depending on the part that is in use. In order to understand ourselves and why we act in a certain way at different times, we must understand the three ego states. The Parent can be divided into "the Nurturing Parent" and "the Critical Parent", while the Child can be divided into "the Free Child" and "the Adapted Child" [43]. Some scholars also divide Child into a third part, "the Little Professor", as Freed & Freed in the book "TA for Kids" [31].

The Parent ego state

The Parent is "a set of thoughts, feelings, and behaviours that are learned or "borrowed" from our parents or other caretakers" [43, p. 15]. The Parent is our ego state when we react as we assume

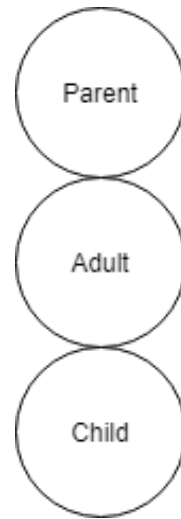


Figure 7: Ego states

our parents or caretakers would have. As mentioned earlier in section 3.1.1, there are two types of Parents. Freed & Freed explain that the Critical Parent (also called CP) is when we criticise ourselves, punish ourselves, and act bossy. The Nurturing Parent (also called NP) is when we are forgiving, affectionate, and supportive [31].

The Adult ego state

In the book "Games People Play", Dr. Berne explains the Adult as someone who tries to survive [40]. Dr. Berne then explains that the Adult attempts to adapt as well as possible to reach a goal, but also attempts to adjust the influence from their parents. This person wants to find the middle ground for different reactions.

The Child ego state

The Free Child (also called FC) is when a person gives spontaneous expressions. The person's behaviour is not affected by the influence of his parents. As such, the person is "free" from their parents' influence [40].

The Adapted Child (also called AC) is when a person modifies their behaviour according to how their parents would have wanted [40].

3.1.2 Transactions

Dr. Berne's description of a transaction is: "The unit of social intercourse is called a transaction. If two or more people encounter each other in a social aggregation, sooner or later one of them will speak, or give some other indication of acknowledging the presence of the others" [44, p. 29].

The transaction consists of a stimulus from one person and a response from the other [32]. This stimulus can be oral or physical. Together, these will provide data for us to analyse. Transactional

analysis is used to establish which ego state is the subject of each stimulus and response [40], be it the Parent, Adult, or Child.

In transactional analysis, there are two types of transactions: "straight transactions (or complementary transactions)" and "crossed transactions" [43].

Straight transactions

When communication between two people occurs in an easy and straightforward manner, it typically consists of straight transactions. Dr. Berne states that communication with straight transactions has the tendency to create chains that could continue endlessly if transactions remain straight [40]. Examples of straight transactions are presented in Figure 8 and Figure 9. Figure 9 presents communication between two different ego states. Communication will flow as long as the individuals keep their ego states such that the transactions remains straight. Notably, there is no requirement to have the same ego states [32].

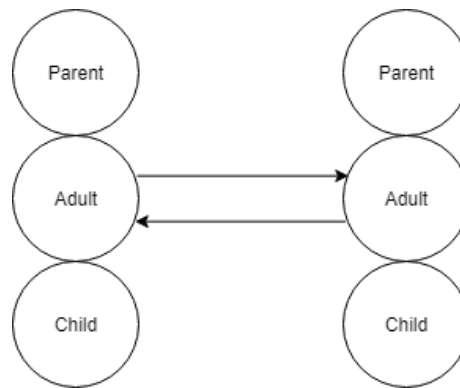


Figure 8: Straight transactions between two similar ego states

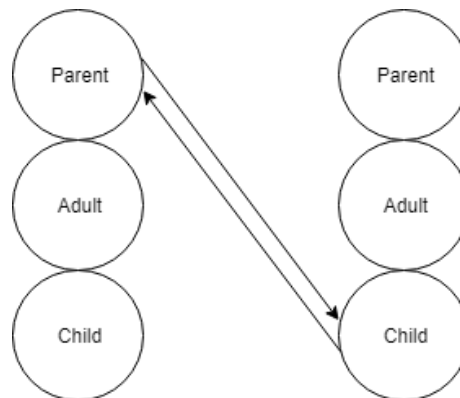


Figure 9: Straight transactions between different ego states

Crossed transactions

With crossed transactions, communication will eventually break down. If there is a change of one or both ego types during communication in which a response crosses a stimulus, a crossed transaction occurs [40]. Notably, crossed transactions could result in a quarrel between the two individuals. Figure 10 and Figure 11 demonstrate how crossed transactions can occur. The conversations begin with a stimulus from Adult to Adult, but the receiver sends a response from another ego state than the stimulus was sent to (e.g., Parent instead of Adult). The transaction is crossed when the response is sent to an ego state on the other side of the stimulus.

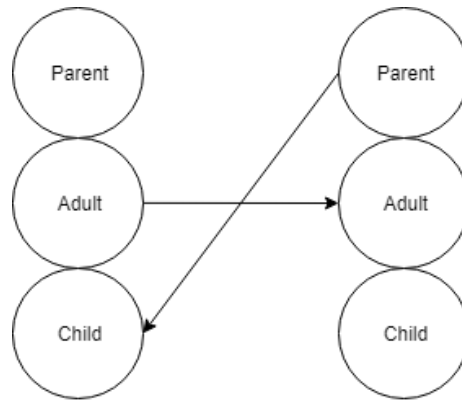


Figure 10: Crossed transactions between two individuals

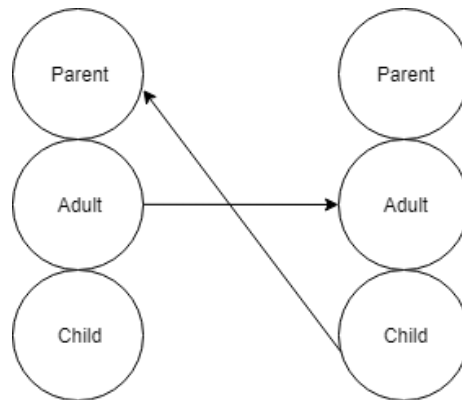


Figure 11: Crossed transactions between two individuals

3.1.3 Transactional Analysis Scale for the Adjective Check List

Charles E. Schaefer's definition of the transactional analysis scale is "... a list of 300 adjectives which have been found to reflect different aspects of an individual's personality" [34, p. 60]. The

book "The adjective checklist manual" by Gough & Heilbrun [45] is cited in both [34] and [46] when describing the adjective checklist.

Schaefer created a transactional analysis scale with the help of three professional clinicians with knowledge on the principles of transactional analysis. They independently listed 15 adjectives from the adjective checklist that they considered to best describe the different ego states. The transactional analysis scale (Table 1) includes six ego states: "Self-Enhancing Parent", "Self-depreciating Parent", "Rational Adult", "Irrational Adult", "Positive Child", and "Difficult Child" [34, p. 62]. Williams & Williams had 15 certified members of the International Transactional Analysis Association identify adjectives that could be used in the identification of the different ego states [46]. The transactional analysis scale separated the ego states into 5 states with 13 adjectives each. Notably, Williams & Williams did not divide Adult into two parts like Schaefer did. The transactional analysis scale in Table 2 listed "Critical Parent", "Nurturing Parent", "Adult", "Free Child", and "Adapted Child" [46, p. 124].

3.1.4 Attitude scales

Russell & Hollander mention two attitude scales in their paper "A Biology Attitude Scale" [47]: the Likert-type scale and the semantic differential scale. They used these scales to detect and measure pupils' changes in attitude towards biology. According to Russell and Hollander, the Likert-type scale is the most widely used of these two scales. Russell and Hollander determined that the reliability of the Likert-type scale was never under 0.90. The Likert-type scale's reliability was further supported in an article by Rogers & Ford's "Factors That Affect Student Attitude Toward Biology" with a Cronbach Alpha Reliability Coefficient of 0.95 [48]. James and Hollander stated that their attitude scales could be modified to fit other subject-matter areas. The Likert-type scale for biology is presented in Figure 12.

3.1.5 Transactional Analysis and machines

According to the definition presented in section 3.1.2 a transaction requires an encounter between two or more people. Therefore, it could be debated whether or not a transaction can occur between a person and a machine such as a computer or tablet. In their book "The Media Equation" [49], Reeves & Nass performed several studies and stated that media experiences and human experiences are equal. Furthermore, in "Employing the transactional analysis in the study of the cyberspace" Łęski used conclusions from Reeves & Nass in his research. Reeves & Nass developed concepts such as personality and feeling in their conclusions, since humans experience the same emotions with media as they do real life. As a result of this, Łęski points out that cyberspace will also constitute a specific communication entity with which we form a relationship. This notion accepts that there is a relationship that a specific personality could be assigned to the media. Łęski states that transactional analysis can enable an analysis of its nature and specificity if humans can have a specific relationship with digital technologies. This creates an opportunity for designers and writers to develop software, text, and other items to match their target audience.

4 Methodology

The present study utilises three different methods with either a qualitative or quantitative approach. These methods include the literature review, the experiment, and surveys. The experiment was performed in fifth-grade and seventh-grade classes as sessions. The sessions took place in a natural setting with a focus on information security materials. The materials were the phenomena. The materials were created as interactive comics with transactional analysis in mind. Currently, there remains a lack of research and information regarding the use of educational information security materials with a transactional analysis approach. This supports the choice of a qualitative approach of the present study.

4.1 Literature review

The first step in the research process was to find and read all relevant literature. The literature search discovered a lack of available research and information on the use of educational information security material that incorporated transactional analysis. Separately, there is research available for both subjects. The information security materials in this study are produced as interactive comics. Therefore, the search for educational comics was conducted during information gathering. However, little research was found on interactive comics specifically. Thus, the focus of the literature review involved transactional analysis, information security awareness material, and the use of comics in education.

4.2 Design-based research

A *design-based research* case study was chosen for the experiment. *Action research* and *Design Science Research* were considered as another possible types of research.

Hevner & Chatterjee defines Design Science Research as:

Design science research is a research paradigm in which a designer answers questions relevant to human problems via the creation of innovative artifacts, thereby contributing new knowledge to the body of scientific evidence. The designed artifacts are both useful and fundamental in understanding that problem [50, p. 5].

The information security comics created for this thesis can be considered an abstract artifact. Comics as artifacts can be developed, and then evaluated by field testing. Hevner, & Chatterjee make references to Cole et al.'s "Being Proactive: Where Action Research Meets Design Research" [51] and Jarvinen's "Action research is similar to design science" [52] when they say that the field study can be executed with methods such as action research [50, p. 17]. While Carstensen & Bernhard

conclude that Design science research techniques can be used in improving the design of learning material, they also describe Design science research as a qualitative research approach [53].

Like design-based research, action research can be used for research in the field. Action research is often used in educational research and has previously been proposed for use in doctoral theses [54]. Notably, Reeves & McKenney suggest that doctoral students use design-based research [55]. The similarities between design-based research and action research result in some researchers viewing design-based research as a type of action research; however, design-based research deviates considerably from the more common forms [54]. Other authors, such as Leedy & Ormrod, discussed these as individual research types [56].

Leedy & Ormrod outline a general characteristic of design-based research, which is: "A multistep, iterative study in which certain instructional strategies or technologies are implemented, evaluated, and modified to determine possible factors influencing learning or performance." [56, p. 102]. As mentioned in [54], designing instructional materials, resources, and a curriculum, among other items, is typical for design-based research. Three interactive webcomics about information security are considered prototypes and were implemented in a lecture for this thesis. These comics are considered information security educational material and fit the description of Willis & Edwards in [54].

The experiment was performed in a natural classroom setting with a teacher and pupils present. The participants were pupils in the fifth and seventh grades. Each student answered questionnaires both before and after they read through the comics. The three comics had different ego states in their character communication. With the use of design-based research, it is possible to continue learning while the study is being conducted. The pupils learned about information security during the session. All the three schools that wanted to participate in this study saw the benefit of having extra lessons on information security, due to both the lesson being conducted by an external person and the educational material in the unfamiliar form of comics.

According to Reeves & McKenney [55], investigations can be conducted both "on" and "with" the comics that were developed in this thesis. This study is a collective case study and will be considered as being conducted with "with" the comics, since they are used to gain knowledge about the use of transactional analysis in information security material.

Anderson & Shattuck concluded that design-based research is increasingly used in educational contexts, particularly in the K-12 context with technological intervention [57, p. 24]. According to findings of their study, 68% of the interventions involved the use of online and mobile technology. The information security materials in the present study involve interactive webcomics that could be considered as being both an online technology and a mobile technology. This supports the decision for using a design-based research methodology. Namely, one challenge is the iterative nature of design-based research. Moreover, design-based research studies commonly last for more than one year [55]. However, the time limit for thesis completion and the available time of schools limits the number of times than an experiment can be performed in a single class. Cooperation with schools requires that they can prioritise the experiment ahead of other lectures. Having more iterations would require more resources and time from the schools and classes, involving more than the

standard duration of one semester for writing a master's thesis.

Each participating class participated for two coherent school hours (a total of 90 minutes) and the sessions included an introduction and information provided by me. The pupils read the comics and answered the questionnaires on their own. There were no discussions among the pupils. However, they could ask questions regarding the comics or questionnaires, or if they had technical problems.

4.3 Questionnaires

Multiple methods were available for data collection. Examples include questionnaires, interviews, and analysing historical information. A questionnaire was the chosen method for this study. Questionnaires were handed out before and after the pupils have read each comic. The questionnaires provide the benefit of asking each pupil the same questions simultaneously, thus being time efficient. This implies that the pupils had the same conditions when answering the questionnaires. While an interview has the potential to obtain more comprehensive answers, an insufficient amount time was available to interview every pupil. Among pupils from the fifth to seventh grade, most are likely unfamiliar with interviews. The questionnaires are easy to understand, and they answered questions on their private and familiar tablet or computer. The pupils can provide dependable answers if they are questioned in an understandable manner about events that they consider meaningful [58].

Each questionnaire includes a section with statements for measuring attitude towards the information security material. The Likert-type scale from the "A Biology Attitude Scale" paper was modified to fit this study (see Figure 12 and Figure 13). Some of the questions did not have a direct translation from English to Norwegian, but were translated to sentences with similar meanings. This is a consequence of having sentences and words that would be difficult to understand for pupils in fifth and seventh grade. This also affects the language used in the comics, e.g., "samtykke (Eng: consent)" is replaced with "tillatelse (Eng: permission)".

An evaluation of each comic is present in each post-comic questionnaire. The comic evaluation questions were inspired by the "Prototype Evaluation Questionnaire" from [29, p. 247]. An example of comic evaluations questions from the post-questionnaire to the Password comic is presented in Figure 14. A part of each post-comic questionnaire also contains a section of questions about the main character in each specific comic. One presented example is Heidi from the Password comic in Figure 15. Questions regarding the comics and their characters were used to find differences between how much the participants appreciated the comics and how they reacted to the characters and use of transactional analysis.

The questionnaires were created and conducted based on available guidelines, e.g. "Constructing a Questionnaire" from [56] and "Guidelines for Research with Children and Young People" [59].

4.4 Ethical considerations

This thesis follows the general ethical guidelines published by The Norwegian Research Ethics Committees [60] as well as the more specific *Guidelines for Research Ethics in the Social Sciences, Humanities, Law and Theology* and *Ethical Guidelines for Internet Research* published by The National

A	B	C	D	E
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1. Biology is very interesting to me. 2. I <i>don't</i> like biology, and it scares me to have to take it. 3. I am always under a terrible strain in a biology class. 4. Biology is fascinating and fun. 5. Biology makes me feel secure, and at the same time it is stimulating. 6. Biology makes me feel uncomfortable, restless, irritable, and impatient. 7. In general, I have a good feeling toward biology. 8. When I hear the word biology, I have a feeling of dislike. 9. I approach biology with a feeling of hesitation. 10. I really like biology. 11. I have always enjoyed studying biology in school. 12. It makes me nervous to even think about doing a biology experiment. 13. I feel at ease in biology and like it very much. 14. I feel a definite positive reaction to biology; it's enjoyable.				

Figure 12: Hollander and Russell Likert-type scale for Biology

Committee for Research Ethics in the Social Sciences and the Humanities [61, 62].

The experiment was performed in Norwegian primary schools with pupils from the fifth and seventh grades. These pupils were 10 to 13 years old. This group requires ethical considerations due to their age and rights. The main rule is that minors who have turned 15 can consent to the collection and use of their personal data, though there are exceptions [63]. One of these exceptions is for children under the age of 18 collecting sensitive personal data requiring consent from their parents. Participation from pupils remained voluntary, even with consent from their parents [64]. This study includes both pupils under the age of 15 and the collection of sensitive personal data. A notification form with information about the study, questionnaires, and consent form were sent to Norwegian Centre for Research Data (NSD), Data Protection Services. NSD Data Protection Services approved the study, including the use of the online questionnaire tool Online Undersøkelse, the questionnaires used, and the consent form. The approval from NSD is presented in the Appendix, in chapter A. More information about Online Undersøkelse can be found in 5.2. Online Undersøkelse follows the General Data Protection Regulation (GDPR) but does collect data from the respondents for the creator of the questionnaire. Some of this information is considered personal data, e.g., The Norwegian Supervisory Authority consider an IP-address as personal data [65]. Online Undersøkelse collects the respondents' IP-addresses for the reasons of avoiding that the same person answering the same questionnaires several times. Online Undersøkelse allows the creator to delete such data, a process that should be performed after the study is complete.

Leedy, % Ormrod discussed ethical issues in research in their book, "Practical Research: Planning and Design" [56]. They separated ethical research issues into four categories: protection from harm,

voluntary and informed participation, the right to privacy, and honesty with professional colleagues. The following sections provide a discussion of each category, and thus contains information from their book.

4.4.1 Protection from harm

This category suggests that research should not do physical or psychological harm. In this study, only psychological is harm relevant. Notably, stress and embarrassment are examples of potential psychological harm that might occur. The participants consisted of pupils that were 10 to 13 years old, and psychological harm is of particular concern given their ages. Also, it is not expected that the pupils can advocate for their own needs and desires compared to older participants. The study was performed in the pupils' natural setting with a teacher present. This most likely decreased the potential for psychological harm.

4.4.2 Voluntary and informed participation

Different schools were approached regarding the desire to perform the present study at their school. The goal was to assess fifth- and seventh-grade classes. The management at each participating school chose which classes could take part in the study. Since the pupils were specifically recruited, they were informed of the nature of the study and could either grant permission or not. Consent must also be granted or declined by a legal guardian because the pupils were all under 15 years of age and sensitive personal data was to be collected. As previously mentioned, informed consent forms were given to the pupils for delivery to their guardians, and pupils had the right to withdraw from the experiment at any time.

4.4.3 Right to privacy

Leedy & Ormrod wrote that "any research involving human beings must respect participants' right to privacy and that how a participant responded or behaved shall not be recognisable by other people" [56, p. 123]. One exception to this occurs when the participant specifically grants written permission. This study focuses on the classes as a whole as opposed to each pupil. This contributes to respecting the right to privacy. Any data gathered on the participants will be used in this thesis only. Moreover, each participant was assigned a unique and random number as an identifier to replace the person's name where it is applicable.

4.4.4 Honesty with colleagues

Appropriate credit and acknowledgment are given where relevant, and the findings are reported in a complete and honest manner.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Nettvett is very interesting to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't like Nettvett, and it scares me to have to take it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think it is unpleasant to have lectures about Nettvett.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nettvett is fascinating and fun.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nettvett makes me feel secure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nettvett makes me feel uncomfortable, restless, irritable, and impatient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I have a good feeling toward Nettvett.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I hear the word Nettvett, I have a feeling of annoyance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I become unsure when I shall learn about Nettvett.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really like Nettvett.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have always enjoyed learning about Nettvett in school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It makes me nervous to even think about taking a Nettvett test.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel calm when I learn about Nettvett.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I become happy when I hear that we shall learn about Nettvett.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 13: Likert-type scale for information security

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Don't know
It was easy to click through the comic.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It was easy to remember the story while I read.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information was difficult to understand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comics is a good way for me to learn about Password.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The comic was confusing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The comic taught me what I wanted to know about Password.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think I will remember what I have learned in a couple of weeks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will change some of my passwords as a result of this comic.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will recommend this comic to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 14: Comic evaluation questions for the Password comic

Choose the most suitable answer for you on the statements about Heidi. *

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly disagree	Don't know
I enjoyed reading what Heidi said.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoyed Heidi's way of speaking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wanted to read more of the comic because of Heidi.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think Heidi made the comic more fun.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heidi said much I did not understand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It was difficult to remember what Heidi said.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I want Heidi to also be a character in other comics.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wanted to read the comics several times because of Heidi.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 15: Character questions for Heidi from the Password comic

5 Tools

The tools Comic-BEE and Online Undersøkelse are both web-based and available to the public. IBM SPSS Statistics was downloaded from the NTNU software library. Further information regarding these tools is presented in the following sections.

5.1 Comic-BEE

Comic-BEE stands for "Comic-Based Education & Evaluation" and is a web-based technology for creating interactive webcomics created by Secure Decisions [66]. Comic-BEE is designed to be used in, but not limited to, cyber security education. Notably, there is no need to use programmers, writers, or artists for developing comics. The interactivity aspect consists of reading one page of the comic and then answering a question by choosing an option among one or more options (see Figure 16). Depending on the choice, there will be an alternative story and ending to the comic. Comic-BEE was awarded as the Best Student Learning Aid for Cyber Security Education in 2018 by the National Cyberwatch Center [67], and it also won the *Building Tomorrow's Workforce Award* from the U.S. Department of Homeland Security Science and Technology [68]. The published version of a comic is suitable for reading on a laptop or tablet.

Hvordan husker du passordene du lager?

Jeg skriver de ned.

Jeg bruker samme passord flere steder.

Jeg sier passordet mitt til andre så de kan hjelpe meg med å huske det.

Jeg lager unike passord for hver side.

Figure 16: Example: Question and possible answers

5.2 Online Undersøkelse

Online Undersøkelse is a website used to create online surveys [69]. Each created survey is assigned a survey link that can be shared via email, Facebook, websites, and other means. Survey reports consist of the answers and data collected from participants. The results can be exported to Excel or CSV, with the possibility of being imported into SPSS.

5.3 SPSS

IBM SPSS Statistics version 25 (also called SPSS) was used to interpret the data collected from questionnaires. SPSS is a piece of statistical software that facilitates data analysis, thereby providing results that either support or refute hypotheses [70].

6 Results

The results originated from questionnaires written in Norwegian. Therefore, the answers were also in Norwegian. The results in this chapter were translated to English. The initial results are presented in the [Appendix](#). Four questionnaires were provided to participants: one before they read the comics, and one after each of the three comics. They were handed out in the following order: Before reading comics, after the Password comic, after the Unwanted incidents comic, and after the Privacy comic. These questionnaires are hereafter named as follows: pre-comic questionnaire, post-password questionnaire, post-unwanted incidents questionnaire, and post-privacy questionnaire.

6.1 Background information

Data from a total of 165 pupils were used in the present study. A total of 165 pupils answered the pre-comic questionnaire, while 142 answered the post-password questionnaire, 149 answered the post-unwanted incidents questionnaire, and 150 answered the post-privacy questionnaire.

On one occasion, a class finished only the pre-comic and post-password questionnaires because the session of 2x45 minutes was not a sufficient amount of time for that class to complete the remaining comics and questionnaires. On this occasion, there were no data to compare before and after the comics or potential differences between the comics. The data from this class was excluded from the data set. A total of three sixth-grade classes participated in the present study. Consent forms for the three sixth-grade classes were not handed out before the sessions, and thus no consent was received on behalf of the pupils. The appropriate individuals had received the consent forms; however, for unknown reasons, the forms were not provided to the students. After a conversation with NSD and my supervisor, it was decided not to use data from the three sixth-grade classes. Therefore, the study has no data from any sixth-grade classes, and data from a total of 59 pupils were not collected.

6.1.1 Demography

The gender distribution was well balanced, with 45,45% girls and 49,70% boys. Overall, 4,85% of the pupils did not want to state their gender. Over 65% identified as being either 10 or 11 years old, while nearly 35% stated that they were either 12 or 13 years old. This corresponds with the age distribution of the grades. A total of six fifth-grade classes and three seventh-grade classes participated in this study. An average pupil in fifth grade is either 10 or 11 years old (depending on their birth date), while a seventh grader is 12 or 13 years old, on average. Notably, 0,61% answered that they were attending sixth grade. Since no data from sixth-grade students were used in this thesis, it is expected that this answer represents a mistake from a pupil.

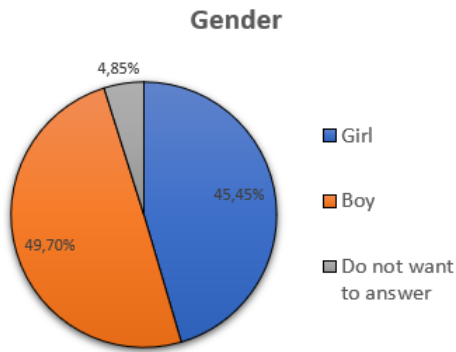


Figure 17: Gender distribution

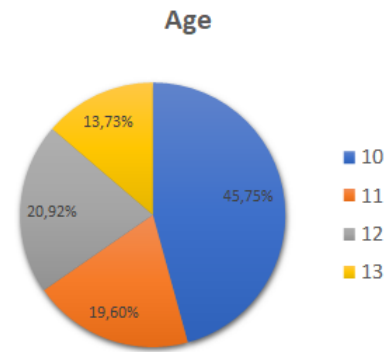


Figure 18: Age distribution

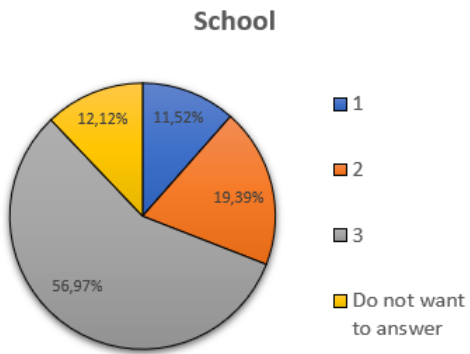


Figure 19: School distribution

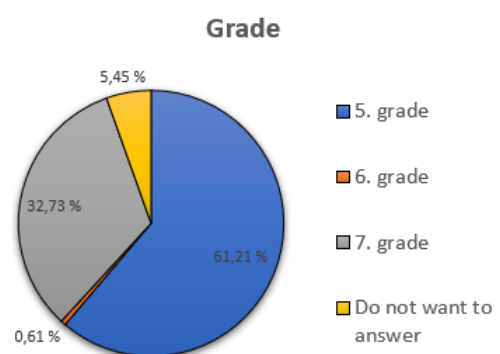


Figure 20: Grade distribution

6.1.2 Teaching of Nettvett

Each pupil was asked if they had received lectures about passwords, unwanted incidents, and privacy. A total of 163 pupils answered the questions. Each class had pupils answering that they have had lectures about passwords, either by answering "Yes" or "Yes, but remember nothing". The highest percentage of pupils answering "No" in a single class was 52,6%. However, nearly half of the pupils in that class remembered having a lecture about passwords. Overall did 63,8% of all participants in the study answered that they have had lecture(s) about passwords. Of the 62 participants that remembered their lecture, were 87,1% were satisfied with the lecture. No classes stood out as being very negative about the lecture.

The highest percentage of pupils in a single class answering "No" to having lecture(s) about unwanted incidents online was 47,6%. Overall, 67,5% remembered having a lecture about unwanted incidents. Of the 63 pupils that remembered their lecture, 92,1% were satisfied with the lecture. As with the lectures about passwords, no class appeared to be very negative about the unwanted incidents lecture.

Regarding privacy, 60,9% of pupils in one class answered that they have not received a lecture about privacy. However, 63,2% remembered having a lecture about privacy. Out of the 55 pupils that remembered their lecture, 90,9% were satisfied with the lecture.

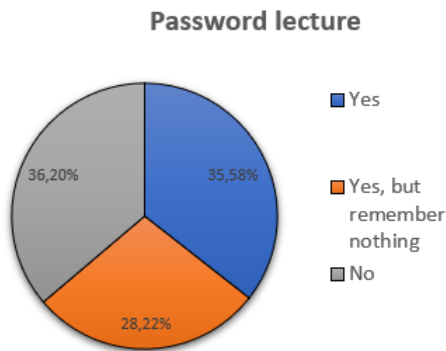


Figure 21: Lecture(s) about passwords

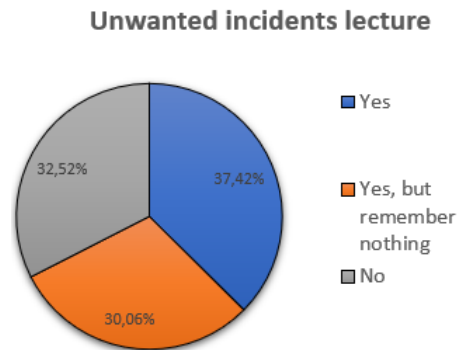


Figure 22: Lecture(s) about unwanted incidents

6.2 Response to comics

The results from each comic questionnaire are listed in this section, and each comic has a dedicated subsection. More complete results are presented in chapter D in the Appendix.

6.2.1 Password comic

A total of 142 pupils answered the post-password questionnaire after reading the Password comic. The comic has an Adult ego state. A total of 139 pupils responded to the question asking if they enjoyed having a comic as an educational material for learning about passwords. Overall, 75,5% enjoyed both having a comic as educational material and the comic itself, while 19,4% wanted to

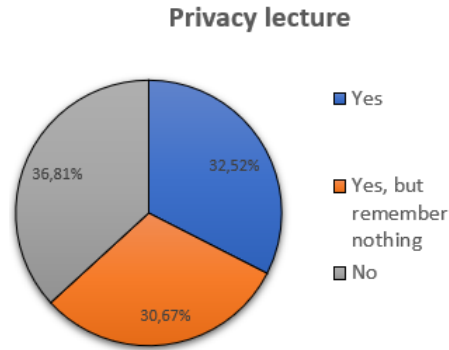


Figure 23: Lecture(s) about privacy

have comics as educational material but disliked the Password comic (see Figure 24).

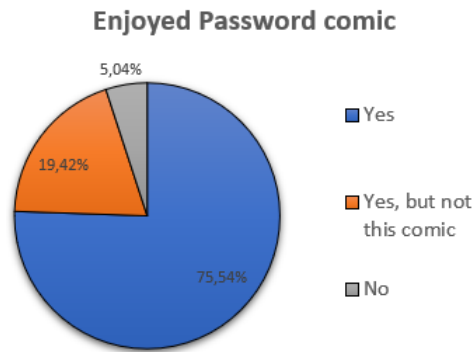


Figure 24: Response to the Password comic

6.2.2 Unwanted incidents comic

A total of 149 pupils answered the post-unwanted incidents questionnaire after reading the Unwanted incidents comic. This comic has a Parent ego state. A total of 148 pupils responded to the question of whether they enjoyed having a comic as educational material for learning about unwanted incidents. Overall, 87,2% enjoyed both having a comic as educational material and the comic itself, while 19,4% wanted to have comics as material but disliked the unwanted incidents comic (see Figure 25).

6.2.3 Privacy comic

A total of 150 pupils answered the post-privacy questionnaire after reading the Privacy comic. This comic has a Child ego state. A total of 149 participants responded to the question of they enjoyed having a comic as educational material for learning about privacy. Overall, 79,9% enjoyed both

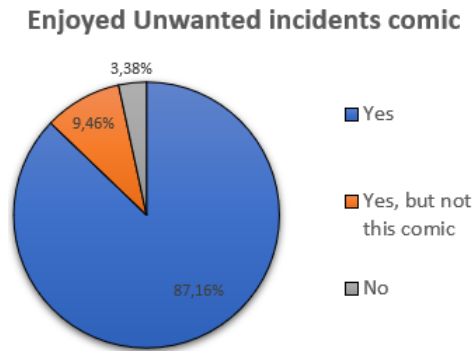


Figure 25: Response to the Unwanted incidents comic

having a comic as educational material and the comic itself, while 13,4% wanted to have comics as material but disliked the unwanted incidents comic (see Figure 26).

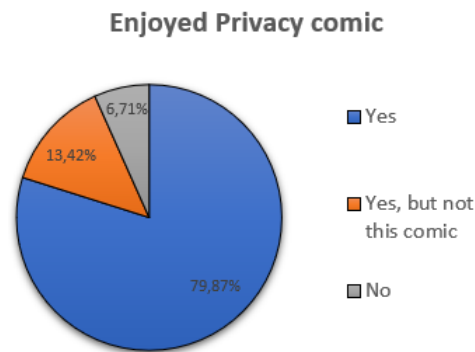


Figure 26: Response to the Privacy comic

6.3 Comparison of comics, characters, and their ego states

Each comic questionnaire had multiple questions about its main character and the comic itself. The response from these questions was compared to determine if the comics and their ego states resulted in different perceptions among the participants. The characters included Heidi from the Password comic, Nora from the Unwanted incidents comic, and Mathias from the Privacy comic.

6.3.1 Students enjoyed having a comic as educational material

The pupils possessed different opinions regarding their enjoyment of the comics, as seen in Figures 24, 25, and 26. Overall, 75,5% enjoyed Password, 87,2% enjoyed Unwanted incidents, and 79,9% enjoyed Privacy. Unwanted incidents (with Nora) exhibited the highest enjoyment level, be-

ing over 7% higher than the next best comic—Privacy with Mathias. Unwanted incidents had the lowest percentage of participants that were not fond of the comic (9,5%). Privacy placed second with 13,4%, while Password was third with nearly 1/5 of participants not enjoying the comic.

6.3.2 Students' perception of the comics

The data from each comic's evaluation questions are compared in this subsection. The questions and results were translated from Norwegian to English. The original data can be found in [Appendix D](#). The eight evaluation questions were similar for all the three comics. These questions were evaluated and then compared with each other. The questions were (replace "topic" with password, unwanted incidents, or privacy):

1. It was easy to click through the comic.
2. It was easy to remember the story while I read.
3. The information was difficult to understand.
4. Comics are a good way for me to learn about "topic".
5. The comic was confusing.
6. The comic taught me what I wanted to know about "topic".
7. I think I will remember what I have learned in a couple of weeks.
8. I will recommend this comic to others.

Table 1 contains data from the Password comic evaluation questions that were answered by 136 participants. Data from the Unwanted Incidents questionnaire is presented in Table 2. A total of 147 pupils answered the comic evaluation questions for Unwanted incidents comic. Table 3 contains data from the Privacy comic evaluation, which was answered by 149 participants. The original data figures found in [Appendix D](#) assigned points to the questionnaire option "Don't know". The scored points for the "Don't know" answer were set to zero in the translated tables, tables 1 - 6. Only percentages are used in the translated tables, and the question numbers refer to the question with the same number among the questions listed above. Data on the number of participants for each question and answer is provided in the Appendix. The data-processing software on Online Undersøkelse's website did not take "negative" questions into account when calculating the scores and percentages. This resulted in some differences in the calculation of percentages and means. Questions that were negative have a - (**minus**) in front of the question number in tables 1 - 8. Negative questions have a scoring system from 5 - 1 in the tables, left to right. "Don't know" was scored 0. Though, the data figures in [Appendix D](#) scored the negative questions as positive questions. Question 1 is a positive question and has a scoring scale from 1 - 5, left to right. "Don't know" was scored 0.

The Privacy comic was rated poorly compared to the two other comics. Out of the eight topical questions in the questionnaires, was the Privacy comic ranked third in five of the questions. In two of the questions, the Privacy comic rated second, and in one question it rated first. Notably, the Unwanted incidents comic had the best results in five of the eight questions. The Password comic was rated first in two of the questions and second in five of the remaining six questions.

Questions about the comics overall provide data that suggests the Unwanted incidents comic was ranked highest among the three comics. These results are reflected in section 6.2, where the Unwanted incidents comic was identified as the most popular comic. The most unenjoyable topic for a comic was Privacy, which had the highest percentage of participant dislike.

Comic-evaluation: Password								
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Don't know %	Mean	Comic Rating
1	3,68	2,94	17,65	38,24	35,29	2,21	3,92	2
2	1,47	3,68	22,79	47,06	23,53	1,47	3,83	2
-3	26,47	46,32	16,18	3,68	4,41	2,94	3,78	1
4	2,21	3,68	14,71	44,85	30,88	3,68	3,87	2
-5	30,15	35,29	22,79	7,35	2,94	1,47	3,78	2
6	1,47	5,88	25,74	44,85	16,91	5,15	3,54	3
7	4,41	8,82	28,68	33,09	17,65	7,35	3,29	1
8	5,15	7,35	19,12	32,35	25,74	10,29	3,35	2

Table 1: Comic evaluation: Password

Comic-evaluation: Unwanted incidents								
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Don't know %	Mean	Comic Rating
1	1,36	2,72	12,93	42,86	38,78	1,36	4,11	1
2	1,36	4,75	10,88	53,06	29,25	0,68	4,02	1
-3	34,69	44,22	9,52	6,80	2,72	2,04	3,95	3
4	2,04	4,08	12,93	45,58	33,33	2,04	3,98	1
-5	32,65	44,22	14,97	4,76	1,36	2,04	3,96	2
6	2,04	5,44	14,97	49,66	23,13	4,76	3,72	1
7	4,76	9,52	18,37	40,82	14,97	11,56	3,17	2
8	3,40	3,40	19,05	34,01	27,21	12,93	3,39	1

Table 2: Comic evaluation: Unwanted incidents

Comic-evaluation: Privacy								
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Don't know %	Mean	Comic Rating
1	4,03	2,68	14,09	43,62	30,20	5,37	3,77	3
2	2,01	6,04	14,09	46,31	26,17	5,37	3,72	3
-3	34,23	38,26	16,11	4,70	1,34	5,37	3,83	2
4	1,34	4,03	17,45	42,95	28,86	5,37	3,78	3
-5	32,21	38,26	14,77	6,71	2,01	6,04	3,74	1
6	2,01	4,70	18,79	44,30	23,49	6,71	3,62	2
7	4,70	9,40	22,15	30,87	18,12	14,77	3,04	3
8	8,72	3,36	22,82	34,90	19,46	10,74	3,21	3

Table 3: Comic evaluation: Privacy

6.3.3 Characters and their ego states

A section of eight questions in every post-comic questionnaire was specific to the main character in that comic. The participants that answered "yes" to the question "Do you remember "character name" from the comic?" were the only ones allowed to answer in that section. The results presented in Figure 29 is from the Privacy comic questionnaire. These results stand out from the two other main characters due to the high percentage of participants answering "No" to the question. Notably, the percentage answering "No" is over 2,5 times higher than for Heidi from the Password comic (Figure 27) and over 5 times higher than for Nora from the Unwanted incidents comic (Figure 28).

Do you remember Heidi from the comic?

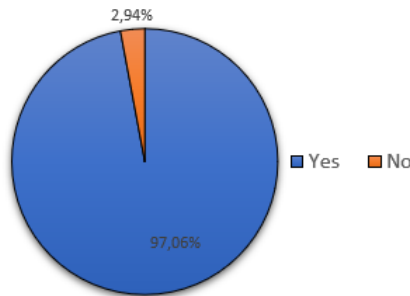


Figure 27: Participants remembering main character Heidi

The section involving eight main character evaluation questions did not consider any negative questions when providing points to each question. This is the same case as with three comics in 6.3.2. Questions 5 and 6 are both negative questions, thus the lowest mean equals the highest positive score. The remaining questions were positive, with the highest mean being the highest positive score. Questions 5 and 6 are considered applicable to the curriculum for the different topics, while questions 1, 2, 3, 4, 7, and 8 are questions involving the characters' ego states. Also, as per the

Do you remember Nora from the comic?

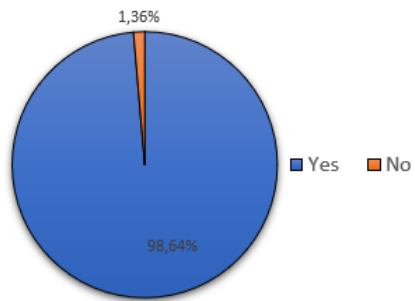


Figure 28: Participants remembering main character Nora

Do you remember Mathias from the comic?

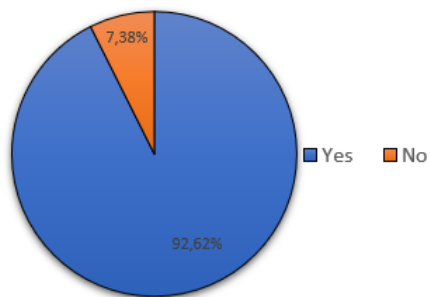


Figure 29: Participants remembering main character Mathias

comic evaluation questions in Section 6.3.2, the possible answer "Don't know" was given points in the original data figures, but not in the translated table. The question numbers in the character evaluation tables refer to the question corresponding with the same number in the following list.

1. I enjoyed reading what "character name" said.
2. I enjoyed "character name"'s way of speaking.
3. I wanted to read more of the comic because of "character name".
4. I think "character name" made the comic more fun.
5. "Character name" said much I did not understand.
6. It was difficult to remember what "character name" said.
7. I want "character name" to also be a character in other comics.
8. I wanted to read the comics several times because of "character name".

Heidi, the main character from the Password comic, was rated first in three questions, specifically questions number 5 to 7. Notably, numbers 5 and 6 are considered curriculum-relevant questions. If those questions are removed from the equation, Heidi is rated behind Nora but ahead of Mathias. A total of 130 pupils answered the specific questions about Heidi (see Table 4).

Character evaluation: Heidi from the Password comic								
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Don't know %	Mean	Comic Rating
1	3,85	6,15	30,77	45,38	8,46	5,38	3,32	3
2	6,15	7,69	32,31	38,46	11,54	3,85	3,30	2
3	3,08	16,15	36,15	26,15	10,00	8,46	2,98	2
4	9,23	20,77	35,38	25,38	6,15	3,08	2,89	2
-5	23,85	43,85	20,00	5,38	6,15	0,77	3,72	1
-6	20,00	39,23	23,08	11,54	3,85	2,31	3,53	1
7	4,62	13,85	34,62	34,62	5,38	6,92	3,02	1
8	11,54	20,77	33,85	16,15	7,69	10,00	2,58	3

Table 4: Character evaluation: Heidi from the Password comic

Table 5 is the result of the questions about the main character Nora from the Unwanted incidents comic. A total of 144 pupils answered the questions about Nora. Nora was rated first in four out of eight questions. Nora was also rated highest in questions 1, 3, 4, and 8.

Mathias, from the Privacy comic, is only rated highest in question 2. A total of 138 pupils answered the questions about Mathias, and the results are shown in Table 6. Mathias is rated the lowest of all the three characters, both with or without question 5 and 6 being included. Mathias is the character that was rated lowest among the participants, and the one that the lowest number of participants remembered.

Character evaluation: Nora from the Unwanted incidents comic								
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Don't know %	Mean	Comic Rating
1	2,78	5,56	25,00	46,53	15,28	4,86	3,51	1
2	2,08	6,94	31,94	38,89	11,81	8,33	3,26	3
3	6,25	9,72	29,17	25,00	21,53	8,33	3,21	1
4	6,94	14,58	36,81	20,83	15,28	5,56	3,06	1
-5	37,50	38,19	12,50	4,17	5,56	2,08	3,92	3
-6	25,00	47,92	14,58	5,56	3,47	3,47	3,75	3
7	6,25	11,81	28,47	29,17	19,44	4,86	3,29	2
8	7,64	13,19	34,72	20,83	17,36	6,25	3,08	1

Table 5: Character evaluation: Nora from the Unwanted incidents comic

Character evaluation: Mathias from the Privacy comic								
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Don't know %	Mean	Comic Rating
1	2,90	5,80	25,36	37,68	21,74	6,52	3,50	2
2	1,45	4,35	27,54	42,75	15,22	8,70	3,40	1
3	5,80	14,49	29,71	25,36	13,77	10,87	2,94	3
4	7,25	14,49	33,33	19,57	11,59	13,77	2,72	3
-5	34,06	42,03	13,77	4,35	2,17	3,62	3,91	2
-6	26,81	44,20	15,94	4,35	2,17	6,52	3,70	2
7	5,80	10,14	28,99	30,43	12,32	12,32	2,96	3
8	5,80	22,46	30,43	17,39	13,04	10,87	2,77	2

Table 6: Character evaluation: Mathias from the Privacy comic

6.4 Likert-type scale for Nettvett

The Likert-type scale for Nettvett was part of the first and last questionnaire. The significance level was set at .05 level as per [48, 47]. A total of 164 pupils answered the first questionnaire, while 149 answered the last one. Table 7 presents the results of the Nettvett attitude scale before the comics (also called the pre-Likert-type scale). Table 8 presents the results of the Nettvett attitude scale after reading the three comics (also called the post-Likert-type scale). The scores 1 - 5 were assigned to each statement, where 5 reflects a strongly favourable attitude and 1 reflects a strongly unfavourable attitude. The scoring was set based on the basic procedure from [47]. This implies that a positive question has a score of 1 - 5 from left to right, while a negative question has a score of 5 - 1 from left to right. The questionnaire software Online Undersøkelse did not reverse the scores for negative questions. The negative questions are scored 1 - 5 as per the positive questions.

The questions were:

1. Nettvett is very interesting to me.
2. I don't like Nettvett, and it scares me to have to take it.
3. I think it is unpleasant to have lectures about Nettvett.
4. Nettvett is fascinating and fun.
5. Nettvett makes me feel secure.
6. Nettvett makes me feel uncomfortable, restless, irritable, and impatient.
7. In general, I have a good feeling toward Nettvett.
8. When I hear the word Nettvett, I feel annoyed.
9. I become unsure when I will learn about Nettvett.
10. I really like Nettvett.
11. I have always enjoyed learning about Nettvett in school.
12. It makes me nervous to even think about taking a Nettvett test.
13. I feel calm when I learn about Nettvett.
14. I become happy when I hear that we will learn about Nettvett.

The arithmetic mean is represented as the \bar{X} , and the standard deviation is represented as S.D. in tables 7 and 8. Some differences in the questions' arithmetic means are observed by comparing the arithmetic means between the pre-Likert-type scale and the post-Likert-type scale. Some questions have only minor mean differences, e.g., question 2 has a mean of 1,99 in the pre-Likert-type scale and 1,91 in the post-Likert-type scale, while question 4 has a mean value of 3,34 in the pre-Likert-type scale and 3,38 in the post-Likert-type scale.

Notably, the data with more significant mean differences between the scales is of particular interest. More significant mean differences imply a more considerable change in attitude. Overall, 57,14% of the questions exhibited changes greater than or equal to 0,10% points in their mean (questions 3, 7, 8, 9, 11, 12, 13, and 14). Positive questions exhibited a decreased mean value (questions 7, 11, 13, and 14), while the negative questions exhibited no mean increase (questions 3, 8, 9, and 12). These scales did not reverse the point scores for negative questions. The lowest mean between the pre-questionnaire and post-questionnaire for these questions represented the

most positive result. Standard deviations for all questions increased from the pre-Likert-type scale to the post-Likert-type scale.

Likert scale before Nettvett session							
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Ø	S.D
1	1,83	6,10	36,59	48,17	7,32	3,53	0,79
2	38,41	39,02	16,46	5,49	0,61	1,91	0,91
3	51,83	40,24	5,49	1,22	1,22	1,60	0,76
4	4,88	9,15	38,41	37,80	9,76	3,38	0,96
5	6,10	8,54	35,37	36,59	13,41	3,43	1,03
6	42,07	34,76	17,68	4,27	1,22	1,88	0,93
7	3,66	4,88	12,80	57,32	21,34	3,88	0,93
8	53,05	35,98	9,15	0,61	1,22	1,61	0,78
9	32,32	47,56	14,02	6,10	-	1,94	0,84
10	4,88	11,59	49,39	25,61	8,54	3,21	0,93
11	4,88	13,41	46,34	21,34	14,02	3,26	1,02
12	39,63	33,54	18,29	7,93	0,61	1,96	0,98
13	3,66	7,32	28,66	37,80	22,56	3,68	1,02
14	4,27	10,37	55,49	21,95	7,93	3,19	0,88

Table 7: The pre-Likert-type scale (before reading the comics)

6.4.1 T-test of likert-type scale

A t-test was performed on data from the pre-comic questionnaire and the post-privacy questionnaire. Both questionnaires have a section of questions that provide data for the Likert-type scale. Points were reversed for the negative questions before the t-test was run. This resulted in the lowest mean being considered the best result instead of the highest, as per the positive questions. The data was then transferred to the SPSS for a t-test to be run. More information regarding SPSS is provided in section 5.3.

The t-test was performed with the following criteria:

1. The null hypothesis (H0) is: *All population means are exactly equal.*
2. The alternative hypothesis (H1) is: *All population means are not all equal.*
3. The alpha level is set at 0,05 to avoid an incorrect conclusion with a 5% risk. This results in a 5% risk of an type I error (concluding that there is a difference between the H0 hypothesis and the H1 hypothesis when there is no actual difference), also called "False positive".

The results of this test are presented in Table 9, Table 10, and Table 11:

It is important to determine if the population means are significantly (statistically) different. The significant (2-tailed) value from Table 11 is used to answer this question. For the means to be significantly different, the p-value must be less than 0,05 (alpha). The p-value is the Sig. (2-tailed) value (Sig. stands for significance level). Table 11 presents the Sig. (2-tailed) value ,000, which is

Likert scale after Nettvett session							
Question nr:	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	Ø	S.D
1	5,37	8,05	33,56	38,26	14,77	3,49	1,02
2	38,93	32,89	21,48	4,03	2,68	1,99	1,01
3	42,28	35,57	15,44	3,36	3,36	1,90	1,01
4	5,37	11,41	40,94	28,19	14,09	3,34	1,03
5	8,05	8,05	30,87	34,23	18,79	3,48	1,13
6	46,31	34,23	14,09	2,01	3,36	1,82	0,98
7	4,70	4,70	21,48	47,65	21,48	3,77	1,00
8	45,64	35,57	12,75	1,34	4,70	1,84	1,02
9	35,57	36,24	20,13	4,70	3,36	2,04	1,03
10	8,05	14,09	40,27	24,83	12,75	3,20	1,09
11	8,72	18,12	39,60	19,46	14,09	3,12	1,13
12	32,89	31,54	20,81	8,05	6,71	2,24	1,19
13	6,04	8,05	29,53	37,58	18,79	3,55	1,07
14	8,05	14,09	51,01	16,78	10,07	3,07	1,02

Table 8: The post-Likert-type scale (after reading the comics)

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1:	Total score pre Q	617,00	14	70,689	18,892
	Total score post Q	537,64	14	53,787	14,375

Table 9: T-test: Paired Samples Statistics

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Total score Q1 & Total score Q2	14	0,929	,000

Table 10: T-test: Paired Samples Correlations

Paired Samples Statistics									
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Total score Q1 & Total score Q2	79,357	28,750	7,684	62,757	95,957	10,328	13	0,000

Table 11: T-test: Paired Samples Test

naturally less than 0,05.

The t-test results indicate that the means are significantly different; thus, H_0 is rejected, implying that the population means are different.

7 Discussion

The first section in this chapter is a discussion of the study, with certain parts being discussed in individual subsections. Also, the limitations of the present study are discussed in the second section of this chapter.

7.1 Sample population

Three schools in the same municipality volunteered to be a part of this study. Participating classes were from the fifth and seventh grades. The individual differences in reading skills among pupils in the fifth and seventh grades were more substantial than predicted. The pupils' participation lasted close to 90 minutes, with approximately 60 minutes being mostly devoted to reading the comics and reading and answering the questionnaires. Feedback received from three teachers stated that they had some pupils that struggled to keep up with the rest of the class, which the author also observed. The pupils that struggled required more time and sometimes support from either the author or a teacher to finish the comics and questionnaires. Notably, some pupils did not finish all of the questionnaires. This is one reason for differences in the number of participants for each questionnaire. The questionnaires were anonymous, and there are no questions that can result in identifying whether or not a pupil has dyslexia or other reading difficulties.

Every pupil was supposed to do the reading and questionnaires individually; however, as mentioned, some pupils required support. As such, the presence of the author or a teacher could have created response bias, particularly for questions regarding potential lectures given by the teacher. The issue of response bias should not be ignored.

According to Statistics Norway, 23.2% of pupils in the fifth grade achieved the lowest level of reading skill on national tests in 2018 [71]. Therefore, 60 minutes of mostly reading is a heavy load for a fifth grader with a low level of reading skill. This reading duration is also most likely a heavy load for a struggling sixth or seventh grader. Possible measures that could ease this burden in later studies could include the following:

- Split the class session from one 90 min session to two or three sessions per class.
- Use of questionnaire software that has text-to-speech support.
- Use Arial, Verdana, or Calibri as the font.
- Use 1,5 line spacing.
- Use font size 13 or 14 (or higher).

The last three points are specifically recommended for people with dyslexia by governmental pedagogical service for municipalities and county municipalities (Statped) [72].

In five classes, not all pupils participated. Some parents or guardians declined to give consent for the study, and some had forgotten to deliver the consent form before the study started. The pupils

that did not have consent worked on other tasks and subjects or were sent to other classes during the study. The lowest number of pupils in a class without written permission was zero, while the highest number of these pupils was three. It is expected that this low number of non-participants did not affect the results.

7.2 The comics, their ego states, and previously lectures

In [29] the use of the ID principle "Personalisation" was described as making it easier for individuals to engage more effectively with the content. Characters with humour are beneficial since they can be perceived to be "well rounded, interesting, and more believable". Humour increases persuasion, comprehension, and retention in education. McClung writes about the importance of characterisation in the paper "Transactional Analysis in the Elementary Classroom: PAC for children" [73]. The characters must seem real and believable to the child in order to be effective. These characteristics are strengthened by being consistent, entertaining, and memorable. For middle-grade children, having colourful and humorous characters creates a unique appeal. This supports Zhang-Kennedy et al.'s statement regarding the importance of "Personalisation".

The differences in participants' responses to the comics leave no question regarding which comic they considered the best and most enjoyable. The participants enjoyed the Unwanted incidents comic more than the second-best comic (the Password comic). The comic was also considered to be rated highest among the three according to the comic evaluation questions. The main character in Unwanted incidents, Nora, was the main character that most participants remembered and valued from the three comics. The Privacy Comic has Mathias as the main character, and it was considered the topic that most participants did not enjoy reading a comic about (6,7% did not like to have a comic on this topic). Moreover, as many as 7,4% of the readers did not remember the main character after reading the comic. The Privacy comic was rated third based on the comic evaluations, while its main character was rated third. The privacy comic uses the child ego state. With the words and descriptions from the [ego states words](#) chapter in the Appendix, the Privacy comic should fit the aforementioned descriptions and recommendations from Zhang-Kennedy et al., and McClung. This is not the result of the evaluation questions on neither the comic itself nor its main character. The Unwanted incidents comic, which used the Parent ego state, ranked highest in both evaluations. The Password comic, which uses the Adult ego state, ranked second, while the Privacy (Child ego state) ranked last. A potential difference could have resulted in participants rating one comic the best; however, a main character from another comic was rated best among the characters. The data from this study does not allow the possibility to differentiate between the ego state and perception of the comics. Are pupils' perceptions of the information security material affected by each comic's ego state? Or is this due to the material being comics? A conclusion on research question 1 is not drawn.

The data does not provide a clear statement on the potential effects that an ego state could have, or which ego state has the most significant impact on the pupils' perception. As previously mentioned, is Unwanted incidents the highest-rated comic, has the highest-rated character, and has the best potential learning outcome according to the pupils. As such, research question 2 remains

inconclusive.

An attitude change is important to changing a person's behaviour. The t-test run on the Likert-type scales for Nettvett concluded that the means are significantly different with a p-value of ,000, which is naturally less than 0,05. Data from the scales indicate a change in the participants' attitudes towards Nettvett. Positive change in attitude from the pre-Likert-type scale to the post-Likert-type scale were only observed in questions 5 and 6. Nettvett makes the pupils feel safer (nr. 5), and pupils feel less irritated, impatient, restless, and uncomfortable about Nettvett (nr. 6). The pre-Likert-type scale and post-Likert-type scale were both given during the same session—one at the beginning and the other at the end. The scales suggest that the overall attitude against Nettvett has become poorer after the classes had received their session. The standard deviation increased on all questions from the pre-Likert-type scale to the post-Likert-type scale. This is understandable when the percentage of "Strongly disagree" increased in all questions except for three, while the percentage of "Strongly agree" increased in all questions except one. The session included four questionnaires and lasted 90 minutes. Some pupils were quick to read and answer the questionnaires, while others required more time. The number of questionnaires and potential waiting or stress might have affected attitudes towards Nettvett. More available time or fewer questionnaires could have provided different results. As such, the potential influence of time, potential waiting, and stress should not be ignored.

Nettvett is not an individual subject in fifth or seventh grade, and it represents only a small part of another subject's curriculum. Notably, studies by [47] and [48] were performed over an entire semester on a single subject through multiple sessions, which is a sharp contrast to the methodology and timeline of the present thesis. Participants in the aforementioned studies were students at a university; therefore, these older participants with more education cannot reasonably be compared with the participants in this thesis. There is no data support to support the conclusion that using interactive webcomics with transactional analysis theory provides an overall positive attitude change among the pupils in this study. It should be noted that pupils developed a more definite (both positive and negative) attitude towards Nettvett during the session. The results could have been different if the pupils had lectures in Nettvett over an entire semester. However, how much time and exposure are needed for someone to form their attitude towards something?

The participants were asked if they remembered having lecture(s) about the passwords, unwanted incidents, and privacy. The answers were weighted differently due to the diversity of the results. A fifth or seventh grader stating they have had a lecture was weighted heavier than a pupil that stated they have not had a lecture. The question is, is it more likely that a pupil could have forgotten a lecture than a pupil remembering a lecture he or she had not received? I consider the former option to be the most likely. Of the 163 participants, 63,80% said that they remembered having a lecture about passwords, but not all pupils remembered anything from it. However, a 63,80% agreement is considered sufficient to conclude that the classes have had a lecture about passwords. Still, 64,42% of the participants did not remember the lecture's content or did not remember the lecture at all. A question in each post-comic questionnaire was as follows: "I think I will remember what I have learned after a couple of weeks" (from reading the comic). In the post-password questionnaire, 50,74% of 136 participants answered "Agree" or "Strongly agree" to that question, while

28,68% answered "Neither agree nor disagree", and 7,35% answered "Don't know". It is unlikely that everyone that agrees or strongly agrees remembers the content from the comics after a certain amount of time. However, I do find it likely that some of those that are unsure or neither agree nor disagree will remember the content. Moreover, the probability of remembering more from reading comics is considered higher than after receiving a lecture about passwords.

Overall, 67,48% of the 163 participants remembered having a lecture about Unwanted incidents, though only 34,42% of those participants remembered its content. In the post-Unwanted incidents questionnaire, 48,99% of the 149 participants answered "Agree" or "Strongly agree" to the statement "I think I will remember what I have learned after a couple of weeks". Meanwhile, 36,03% stated that they did not know or that they neither agree nor disagree. It would not be expected that all the participants answering "Agree" and "Strongly agree" will remember the content after some time. However, some of the participants that did not know or that neither agreed nor disagreed will most likely remember the content. There is a higher probability that the participants will remember more from comics than from the lecture they were given about unwanted incidents.

Of the 163 participants, 63,19% remembered having a lecture about privacy. Only 32,52% of these 163 participants remember having the lecture as well as its content—the lowest value among the three comics. Privacy had a total of 55,78% answering "Agree" or "Strongly Agree" to the question "I think I will remember what I have learned after a couple of weeks", while 36,92% answered that they "Neither agree nor disagree" or "Don't know". The privacy lecture had the lowest percentage of participants remembering the lecture and its content, and the highest percentage of those answering "Yes, but not its content" and "No". Notably, the differences in answers regarding lectures are low between the questionnaires. The lecture on privacy had the lowest percentage of participants remembering it and its content, while the comic was the lowest rated, and its main character was the least liked by participants. However, on the question "I think I will remember what I have learned after a couple of weeks", the Privacy comic had the highest percentage of participants answering "Agree" and "Strongly agree". Since the differences in percentage are low between answers for the various comics and lectures, it is not appropriate to make any strong conclusions from these data.

Testing the participants after a couple of weeks or at the end of the semester could provide better data to assess the research questions. This test could answer whether the pupils remembered what they have learned from the comics, and could also provide a possible answer to which comic and ego state helps pupils remember the most.

7.3 Limitations

The present thesis has some limitations, which include:

- Sample population.
- The use of questionnaire.
- The comics and their ego states.
- Not teaching the pupils transactional analysis.

7.3.1 Sample population

The findings of the present study are limited to the three schools that participated. These schools are all part of the same municipality, and only fifth and seventh grade pupils were studied. It remains possible that a more significant and geographically spread population could provide different results than those observed for this study. Notably, the study did not gather data on an individual level; therefore, it was not possible to interpret data to see if factors such as nationality, reading skills, and reading difficulties affected pupils' perception of the information security material provided.

7.3.2 The use of questionnaires used to collect the data

The questionnaires consisted mostly of multiple-choice questions, and the participants could not explain their answers further.

7.3.3 The comics and their ego states

Parent ego state can be divided into the "Nurturing Parent" and "Critical Parent". Children ego state can be divided into the "Free Child", "Adapted Child", and "Little Professor". Each state has their own set of thoughts, feelings, and behaviours. For example, the "Nurturing Parent" has different thoughts, feelings, and behaviours to the "Critical Parent".

Each comic was assigned an ego state, and, with the exception of the Child "Little Professor" state, all parts of each ego state were represented in its respective comic. However, it is not possible to determine if one part of an ego state affects the reader differently or more than the other part of the ego state. This implies that there is a possibility that the "Nurturing Parent" is perceived better than the "Critical Parent", or vice versa.

7.3.4 Not teaching the pupils transactional analysis

In the studies [18] and [19], participants were taught about transactional analysis. However, this was not the case in the present thesis. The results might have been different if the pupils were lectured on transactional analysis before or during the study.

8 Conclusion

In recent years, Norway has made information security an increasingly important priority. An essential part of information security is human behaviour. One goal for the Norwegian government is to educate pupils in information security to meet the societal demands—both today and in the future. Every second year, reports are published about pupils and their use of media, including their behaviour regarding information security. These reports show a negative trend, e.g., increased sharing of passwords and sharing of pictures without consent. This thesis assessed the possibility of improving the educational materials used for teaching information security to pupils in Norwegian primary schools. Transactional analysis has been used in educational research with great success, but until now has not been applied to educate pupils on the subject of information security.

The Directorate for Education and Training in Norway have decided on learning goals for digital skills among pupils in elementary schools. Three topics were specifically mentioned. These included passwords, unwanted incidents, and privacy, which subsequently became the themes of the three interactive comics used in this study. An interactive comic has the advantage of interacting with the reader by communicating through text, images, and showing the consequences of the reader's choices. Each comic featured a main character with a distinct ego state from transactional analysis theory. The Password comic's main character featured the Adult ego state, the Unwanted incidents comic's main character featured the Parent ego state, and the main character in the Privacy comic featured the Child ego state. Their behaviours, body language, and manner of speaking was set after certain recognised adjectives listed in books and adjective checklists. Six fifth-grade classes and three seventh-grade classes from three schools participated in the study. Each class had one session consisting of a questionnaire to establish the pupils' previous lectures in information security followed by three interactive webcomics with their respective post-questionnaires. The final questionnaire also contained questions aimed to determine potential changes in the pupils' attitudes towards information security.

A review of the results from the post-comic questionnaire indicated no difference between the ego states and pupils' opinions of the comics' quality. The expected learning outcomes from a comic corresponded with the pupils' opinions of each comic and its main character. The Unwanted incidents comic was rated first in all three categories (best comic, expected learning outcome, and best main character/ego state). The Password comic was ranked second in all the three categories, while the Privacy comic rated third. The potential effect of an ego state was not possible to measure, thus making it impossible to adequately assess research questions 1 and 2. Notably, no significant results from the present study could address whether a specific ego state can affect pupils' perceptions of the provided information security material, nor could they determine which ego state comic affects pupils' perceptions most (to improve the effectiveness of information security material).

Overall, over 50% of the pupils believe they would remember what they learned from the Password comic after a couple of weeks, while 36,20% remembered the content from their previously lecture(s) about passwords. These numbers are positive, indicating that pupils potentially remember more after reading the interactive Password comic than after their previous lecture(s).

Furthermore, 34,42% remember the lecture(s) about Unwanted incidents online, while nearly 50% believe they will remember what they learned from Unwanted incidents comic after a couple of weeks. These numbers are also promising in the context of pupils remembering more from comics than their previous lecture(s).

In addition, 32,52% remembered having a lecture about privacy, as well as its content. Regarding the Privacy comic, over 55% stated that they would remember its content after a couple of weeks. As with the other two comics, this result is considered positive compared to their memory of previous lecture(s). In the future, a new questionnaire could potentially determine whether these numbers are positive or if the pupils eventually forget what they learned from one or more of the comics.

Attitude and behaviour are often connected. For practice in information security, it is beneficial for pupils to have a positive attitude towards the topic. The first and last questionnaires included questions using the Likert-type scale for measuring potential changes in pupils' attitudes towards information security. The data indicated a wide spread of answers to the questions; however, a more negative overall attitude towards information security was observed. Notably, this study measured changes after only one session; therefore, it is uncertain whether this attitude is changed over the long term or only immediately after the session.

8.1 Future Work

Teaching pupils about information security is essential in today's world and will continue to be necessary. A study with more iterations and a significantly greater geographical reach could produce more data to help answer the research questions presented in this thesis. Additionally, more iterations over an extended period of time could also provide data to observe whether pupils change their behaviour over the long term.

A quantitative research approach used in this study did not provide sufficient data to make any substantive conclusion. A qualitative research approach could, however, provided better insights to the problem. Grounded theory study is a qualitative research design which could be used to formalize the problem better, since so little is know about the education of young individuals in cybersecurity in Norway. Grounded theory might make it possible to derive a theory about the use of ego states from the data. Interviewing pupils perchance show how the pupils' actions and interactions with the comics influence each other. The use of Grounded theory allows using Design science research as well, a research approach that was discussed in [4.2](#).

As mentioned in [2.4](#), many studies have highlighted positive results from using comics in their lectures. One suggestion is to have studies that could research and compare the results of using interactive comics with interactive comics using transactional analysis. This could provide data that might outline potential benefits from the use of transactional analysis. One possible study could use other types of educational material with transactional analysis instead of only interactive comics.

Such expansion might identify new teaching methods that could provide greater benefits with the use of transactional analysis.

The Parent comic includes both the "Nurturing Parent" and "Critical Parent" portions from Parent ego state, while the Child comic consists of the "Free Child" and "Adapted Child" portions from Child ego state. By having different material for each ego state part, a future study could identify distinctive differences in readers' perceptions if ego state parts were to be compared. Finally, teaching participants about transactional analysis before or during the study could also affect their perception of the material.

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Appendices

A NSD approval

The approval from NSD for gathering sensitive information.

NSD Personvern
06.03.2019 13:10

Det innsendte meldeskjemaet med referansekode 600642 er nå vurdert av NSD.

Følgende vurdering er gitt:

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personverngivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 06.03.2019. Behandlingen kan starte.

MELD VESENTLIGE ENDRINGER
Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde:

nsd.no/personvernombud/meld_prosjekt/meld_endringer.html

Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 19.06.2019.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettfærdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lenger enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1 f) og sikkerhet (art. 32).

[Onlineundersokelse.com](https://onlineundersokelse.com) er databehandler i prosjektet. NSD legger til grunn at behandlingen oppfyller kravene til bruk av databehandler, jf. art 28 og 29.

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Kontaktperson hos NSD: Karin Lillevold
Tlf. Personverntjenester: 55 58 21 17 (bast 1)

Figure 30: Approval from NSD on notification form.

B Examples of ego state words, phrases, and behavior/adjectives describing characters

Each comic has its section with examples from the specific comic. Words, phrases, and behavior/adjectives are listed with an example from the comic. E.g., in the Password comic is the phrase "*Based on facts*" listed. An image is shown where the phrase is used. The words, phrases, behavior, and adjectives are from the Ego state words classification list in [Appendix C](#).

B.1 Password comic: Adult

B.1.1 Words and phrases

- *Reasoned statement*, in Figure 31.

Conversation:

Heidi: "You are responsible for your password. That means that you could be responsible for whatever another person does while using your account."



Figure 31: Passord comic. Word/phrase: Reason statement.

- *What*, in Figure 32.

Question: "What do you think about this?"

Hva tenker du om dette?

Figure 32: Passord comic. Word/phrase: What.

B.1.2 Behavior/adjectives describing character

- *Non-judgmental*, in Figure 33.

The following is a conversation after choosing a weak password.

Heidi: "Regular words, personal words, year and sequential numbers are easier to guess for both humans and computers. It is wise to choose something more difficult."



Figure 33: Passord comic. Behavior: Non-judgmental.

- *Precise*, in Figure 34.

Conversation:

Heidi: "Also, password sentences have requirements. The sentence should consist of least 5 words, the use of space, symbols, numbers, and both small and large letters."

B.2 Uønskede hendelser comic: Parent

B.2.1 Words and phrases

- *Must*, in Figure 35.

Conversation:

Text message from Lucas: "You must send more lightly dressed pictures during the day. Or



Figure 34: Passord comic. Behavior: Precise.

else...".

Nora: "What is going on?".



Figure 35: Uønskede hendelser comic. Word/phrase: Must.

- *That's stupid*, in Figure 36.

Conversation:

Nora: "He approached me online. He wanted lightly dressed pictures, otherwise, he would not help me.".

Mother: "That's stupid. It's great you're telling me.".

B.2.2 Behavior/adjectives describing character

- *Distrustful*, in Figure 37.

Conversation:

Nora: "What do you mean?".



Figure 36: Uønskede hendelser comic. Word/phrase: That's stupid.

Mother: "He may be tried to trick you. I'm worried he impersonated as a talent scout.".



Figure 37: Uønskede hendelser comic. Behavior: Distrustful.

- *Praising*, in Figure 38.
Chat:
Lucas: "You're a natural! :)".
Nora: "Thanks! :)".
Lucas: "Only need your phone nr :)".

B.3 Personvern comic: Child

B.3.1 Words and phrases

- *I could not be bothered*, in Figure 39.
Conversation:
The person to the left, Andreas: "It is not allowed to share without asking first. Everybody

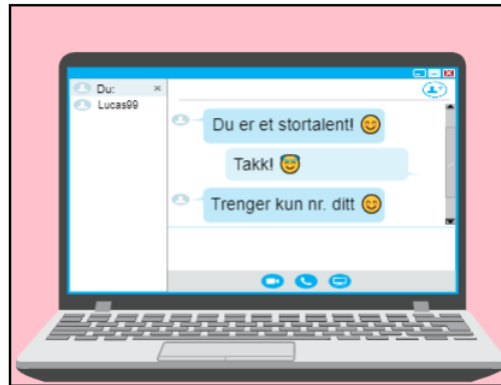


Figure 38: Uønskede hendelser comic. Behavior: Praising.

sees that it is me!".

The person in the middle, Emil: "I could not be bothered. Better stay on your feet when you are in public."

The person to the right, Mathias: "I think...".



Figure 39: Personvern comic. Word/phrase: I could not be bothered.

- *I think...*, in Figure 40.

Conversation:

The person in the middle, Mathias: "I think he's right. I believe that you cannot share without consent."

Person to the right, Emil: "But the picture is taken out in public.":

B.3.2 Behavior/adjectives describing character

- *Discouraged look/Downcast eyes*, in Figure 41.

Conversation:

Emil: aww snap... the parents probably say no...".



Figure 40: Personvern comic. Word/phrase: I think...



Figure 41: Personvern comic. Behavior: Discouraged look/Downcast eyes.

- *Immature*, in Figure 42.

Conversation:

The person to the left, Andreas: "There are many ugly comments on the picture."

The person to the right, Emil: "Ha! You lack a sense of humor. I can't listen to this. I'm out of here."



Figure 42: Personvern comic. Behavior: Immature.

C Ego states words classification

Ego states words

Words that are found in more than one article are only listed in one of the sources. E.g. is *When* found in both *TA for Kids* and *Transactional analysis: A method of analyzing communication*. *When* is only listed in *TA for Kids*' list in *Words/phrases*. The complete reference list is on the final page this chapter.

Words/phrases			
Source	Parent	Adult	Child
[1]	<ul style="list-style-type: none"> - Always - Critical words - Don't cheat - Don't lie - Don't steal - For once and for all - How to - Judgmental words - Let me help you - Must - Never - Never forget - Patronizing language - Posturing language - Ridiculous! - Shame on you - Should - Silly - Stop that! - That's stupid - Think positive - Under no circumstances 	<ul style="list-style-type: none"> - False - How - how much - I believe - I realize - I see - I think - In my opinion - In what way - May I have... - No thanks, I... - possibly - probably - Questioning and querying words - Reasoned statements - The answer is.. - True, comparative expressions - What - When - where - Who - Why - Will you help me please? 	<ul style="list-style-type: none"> - Biggest - Darn - Gee - Golly - Heck - I don't care - I don't know - I gonna - I guess - I hate you - I like you - I need - I want - I want it now - I wish - Let's go out and play - Let's make believe that... - Look at me - No, I won't - not again - oh no - Ouch - Please - Right on - Things never go right for me - Whew - Wow - Yes, Ma'am. - Yippee - You can't make me
		68	
Source	Parent	Adult	Child
[2]	<ul style="list-style-type: none"> - Don't - You must - You should 		

	- You should not		
Source	- Parent	Adult	Child
[3]	<ul style="list-style-type: none"> - I will sort it out for you - That is disgraceful 		<ul style="list-style-type: none"> - I will try hard - Thank you
Source	Parent	Adult	Child
[4]	<ul style="list-style-type: none"> - Commands - Disgusting - If I was you - Lazy - Ludicrous - Meaningless - Naughty - Nonsense - Once and for all - Poor little darling - Shocking - Stupid - You poor thing 	<ul style="list-style-type: none"> - True - Untrue 	<ul style="list-style-type: none"> - Better/best - I couldn't be bothered - I don't know - I think - Large/larger - When I grow up

Behavior/adjectives describing character:			
Source	Parent	Adult	Child
[1]		<ul style="list-style-type: none"> - Answer the questions - Choose to - Decide to... - Plan an outing, party, - Read for fun - Read this book - Read to learn - Work on 	<ul style="list-style-type: none"> - Being afraid - Being mad - Being sad - Climbing trees - Crying - Eating ice creams - Jumping rope - Laughing - Pouting - Slamming doors - Sulking - Whining - Worrying
Source	Parent	Adult	Child
[5]*.	<ul style="list-style-type: none"> - Appreciative - Autocratic - Bossy - Complaining - Considerate - Demanding 	<ul style="list-style-type: none"> - Adaptable - Alert - Clear-thinking - Deliberate - Efficient - Foresighted 	<ul style="list-style-type: none"> - Adventurous - Aggressive - Changeable - Cheerful - Curious - Dependent

*Irrational Adult adjectives is not considered relevant.	<ul style="list-style-type: none"> - Distrustful - Fault-finding - Forgiving - Friendly - Fussy - Generous - Honest - Industrious - Intolerant - Nagging - Opinionated - Patient - Praising - Prejudiced - Responsible - Rigid - Sarcastic - Self-confident - Self-punishing - Stern - Trusting - Warm 	<ul style="list-style-type: none"> - Individualistic - Intelligent - Insightful - Logical - Original - Planful - Rational - Realistic - Reasonable 	<ul style="list-style-type: none"> - Emotional - Energetic - Enthusiastic - Excitable - Fearful - Frank - Humorous - Imaginative - Immature - Impatient - Impulsive - Interests wide - Moody - Natural - Pleasure-seeking - Rebellious - Self-centered - Selfish - Spontaneous - Sulky - Uninhibited - Weak - Whiny - Zany
Source	Parent	Adult	Child
[6]	<ul style="list-style-type: none"> - Affectionate - Considerate - Dominant - Forceful - Gentle - Helpful - Intolerant - Kind - Severe - Sympathetic - Tolerant - Understanding - Unselfish 	<ul style="list-style-type: none"> - Capable - Fair-minded - Methodical - Organized - Precise - Unemotional 	<ul style="list-style-type: none"> - Affectionate - Anxious - Apathetic - Argumentative - Arrogant - Artistic - Awkward - Complaining - Confused - Defensive - Hurried - Inhibited - Nervous - Sexy
Source	Parent	Adult	Child
[3]	<ul style="list-style-type: none"> - Angry voice - Authoritarian - Calm voice - Caring - Consoling touch - Furrowed brow 	<ul style="list-style-type: none"> - Attentive - Aware - Calm voice - Enquiring voice - Level eye contact 	<ul style="list-style-type: none"> - Clear demonstration of feelings - Downcast eyes - Expressive voice - Passive - Placating voice

	<ul style="list-style-type: none"> - Judgmental - Pointed finger - Pounding on table 	<ul style="list-style-type: none"> - Non-judgmental - Relaxed 	<ul style="list-style-type: none"> - Vigorous head nodding
Source	Parent	Adult	Child
[7]	<ul style="list-style-type: none"> - Nurturative - Overprotecting - Supportive 	<ul style="list-style-type: none"> - Based on facts 	<ul style="list-style-type: none"> - Angry - Creative - Hateful - Intuitive - Loving - Playful - Self-pleasing - Spontaneous
Source	- Parent	- Adult	- Child
[4]			<ul style="list-style-type: none"> - Discouraged look - Shaking lips - Temper tantrum

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D Questionnaires and results

This chapter includes different questionnaires with the results used in this study. They are listed in the same order they were answered in the study.

Spørreskjema FØR undervisning om tegneserier

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

1. Hvor gammel er du?

Vil du ikke svare lar du feltet stå tomt.

Antall deltakere: 153

 Vis alle 118 tidligere svar

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2. Kjønn? *

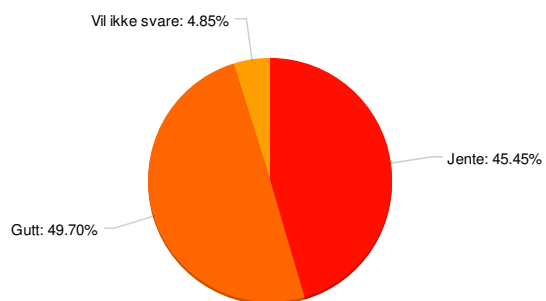
Antall deltakere: 165

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

75 (45.5%): Jente

82 (49.7%): Gutt

8 (4.8%): Vil ikke svare



3. Hvilken skole går du på?

Hvis du ikke ønsker å svare så lar du feltet være tomt.

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

Antall deltakere: 147



4. Hvilken klasse går du i? *

Antall deltakere: 165

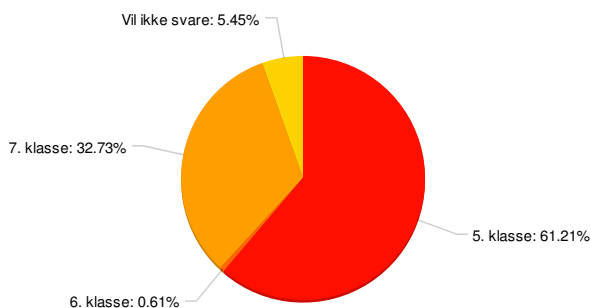
Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

101 (61.2%): 5. klasse

1 (0.6%): 6. klasse

54 (32.7%): 7. klasse

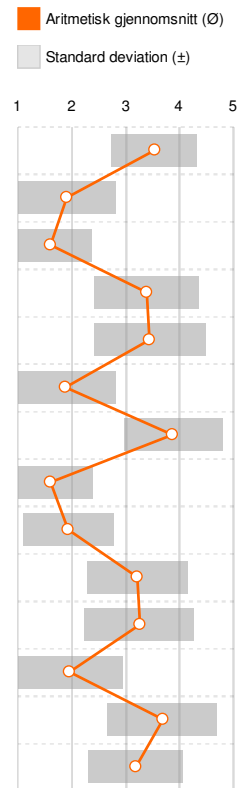
9 (5.5%): Vil ikke svare



5. Her kommer det setninger om hva du tenker om nettvett. Nettvett er å være smart når du bruker nett, enten på mobil, nettbrett eller pc. Deling av bilder, passord og uønskede hendelser er alle en del av nettvett. Du skal velge det svaret på hver linje som du er mest enig i. Det er ingen feil svar. Svar det du tenker her og nå. Er du helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 164

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Ø	±	
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%			
Nettvett er veldig intere...	3x	1,83	10x	6,10	60x	36,59	79x	48,17	12x	7,32	3,53	0,79	
Jeg liker IKKE nettvett, o...	63x	38,41	64x	39,02	27x	16,46	9x	5,49	1x	0,61	1,91	0,91	
Jeg synes det er ubehag...	85x	51,83	66x	40,24	9x	5,49	2x	1,22	2x	1,22	1,60	0,76	
Nettvett er spennende o...	8x	4,88	15x	9,15	63x	38,41	62x	37,80	16x	9,76	3,38	0,96	
Nettvett får meg til å fø...	10x	6,10	14x	8,54	58x	35,37	60x	36,59	22x	13,41	3,43	1,03	
Nettvett får meg til å fø...	69x	42,07	57x	34,76	29x	17,68	7x	4,27	2x	1,22	1,88	0,93	
Vanligvis synes jeg at ne...	6x	3,66	8x	4,88	21x	12,80	94x	57,32	35x	21,34	3,88	0,93	
Når jeg hører ordet Nett...	87x	53,05	59x	35,98	15x	9,15	1x	0,61	2x	1,22	1,61	0,78	
Jeg blir usikker når vi sk...	53x	32,32	78x	47,56	23x	14,02	10x	6,10	-	-	1,94	0,84	
Jeg liker veldig Nettvett.	8x	4,88	19x	11,59	81x	49,39	42x	25,61	14x	8,54	3,21	0,93	
Jeg har alltid likt å lære...	8x	4,88	22x	13,41	76x	46,34	35x	21,34	23x	14,02	3,26	1,02	
Jeg blir nervøs når jeg t...	65x	39,63	55x	33,54	30x	18,29	13x	7,93	1x	0,61	1,96	0,98	
Jeg føler meg rolig når v...	6x	3,66	12x	7,32	47x	28,66	62x	37,80	37x	22,56	3,68	1,02	
Jeg blir glad når jeg høre...	7x	4,27	17x	10,37	91x	55,49	36x	21,95	13x	7,93	3,19	0,88	



6. Hvis du kunne velge undervisningen selv, hva ville undervisningen om Nettvett bestått av?

Mangler et svar så skriver du det i "Annet" boksen.

Du kan velge flere svar. * Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

Antall deltakere: 163

72 (44.2%): Undervisning på
tavle eller skjerm

77 (47.2%): En historie om
en person eller hendelse

70 (42.9%): Tegneserie

17 (10.4%): Oppgaver du
gjør alene

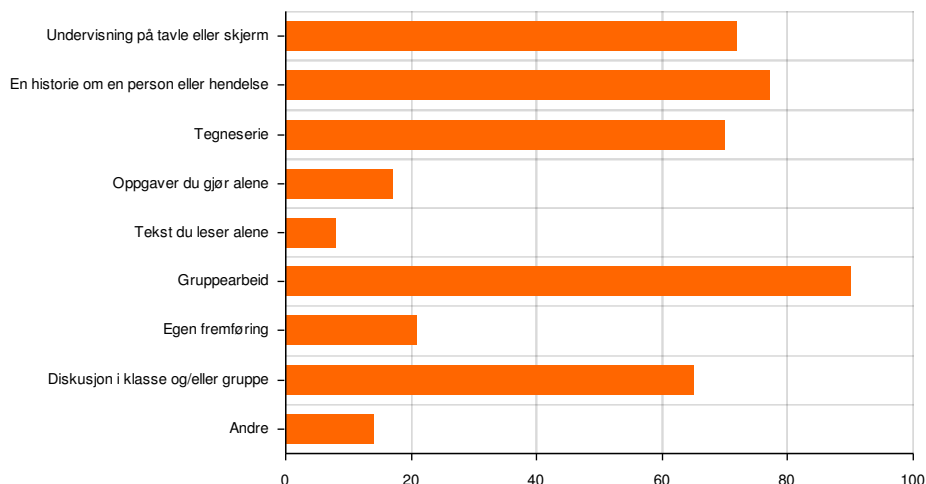
8 (4.9%): Tekst du leser
alene

90 (55.2%): Gruppearbeid

21 (12.9%): Egen
fremføring

65 (39.9%): Diskusjon i
klasse og/eller gruppe

14 (8.6%): Andre



Svar(er) fra ekstra feltet.:

- Se på film om nettvett
- Oppgaver på nettbrett
- nei
- film
- jeg hvet ikke det kan være foskjellig men ikke fremføring
- jeg hadde ikke unervist om noen ting
- vise e film
- alt annet
- fysisk aktivitet
- Vet ikke
- 2 og 2
- nei
- at hver eneste barn kunne ha hat en unervisning på en måte og snakket lit om nettvett
- film

7. Har du hatt, eller kan du huske at du har hatt undervisning om passord? *

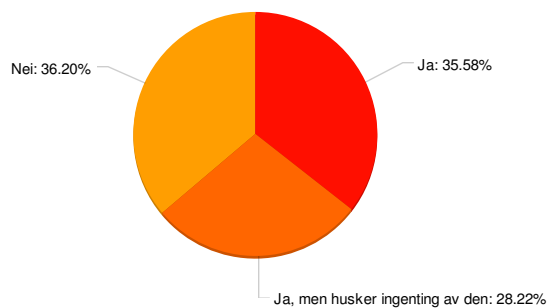
Antall deltakere: 163

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

58 (35.6%): Ja

46 (28.2%): Ja, men husker ingenting av den

59 (36.2%): Nei

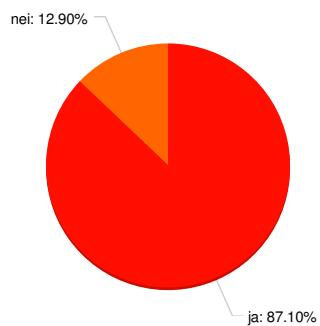


8. Var du fornøyd med undervisningen du fikk om passord? *

Antall deltakere: 62

54 (87.1%): ja

8 (12.9%): nei



9. Hva besto undervisningen om passord av?

Mangler et svar så skriver du det i "Annet" boksen.

Du kan velge flere svar. * Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

Antall deltakere: 59

31 (52.5%): Undervisning på tavle eller skjerm

22 (37.3%): En historie om en person eller hendelse

4 (6.8%): Tegneserie

5 (8.5%): Oppgaver du gjorde alene

- (0.0%): Tekst du leste alene

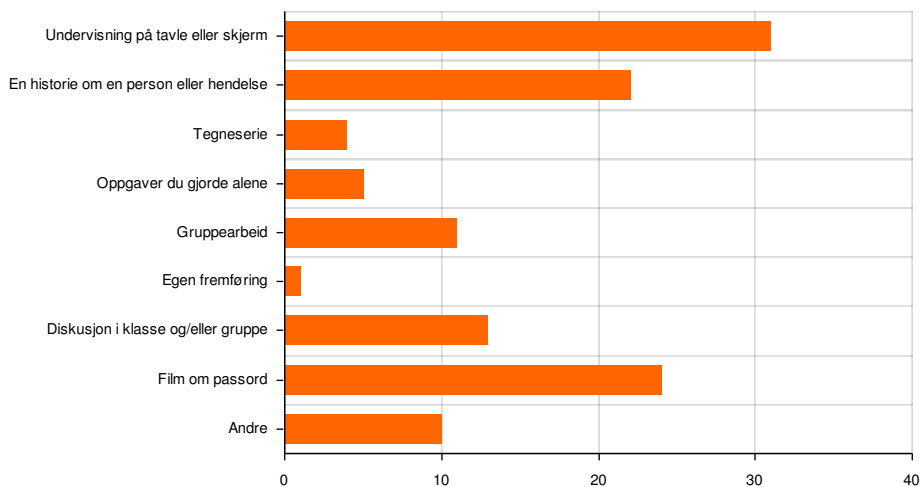
11 (18.6%): Gruppearbeid

1 (1.7%): Egen fremføring

13 (22.0%): Diskusjon i klasse og/eller gruppe

24 (40.7%): Film om passord

10 (16.9%): Andre



Svar(er) fra ekstra feltet.:

- En video på tavla og så snakket vi om videoen og hva som kunne skjedd.og til slutt når jenta viste passordet skrev en gutt det ned
- på pc
- oppgaver med lerinspartneren
- Sa hvem vi har delt passord med
- det kom en mann til skolen får å snakke om passord med oss. Han sa at vi ikke må dele passord.
- husker ikke
- Far lærte meg
- husker ikke
- kode løsning
- Usikker på om vi har hatt det

10. Har du hatt, eller kan du huske at du har hatt undervisning om uønskede hendelser på internett? *

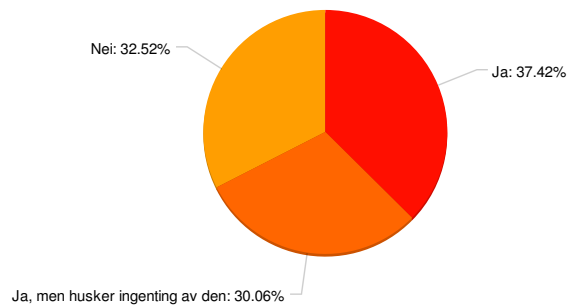
Antall deltakere: 163

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

61 (37.4%): Ja

49 (30.1%): Ja, men husker ingenting av den

53 (32.5%): Nei

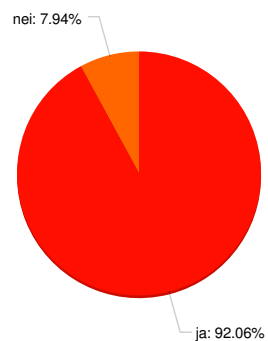


11. Var du fornøyd med undervisningen du fikk om uønskede hendelser på internett? *

Antall deltakere: 63

58 (92.1%): ja

5 (7.9%): nei



12. Hva besto undervisningen om uønskede hendelser på internett av?

Mangler et svar så skriver du det i "Annet" boksen.

Du kan velge flere svar. * Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

Antall deltakere: 61

33 (54.1%): Undervisning på tavle eller skjerm

25 (41.0%): En historie om en person eller hendelse

5 (8.2%): Tegneserie

4 (6.6%): Oppgaver du gjorde alene

2 (3.3%): Tekst du leste alene

5 (8.2%): Gruppearbeid

3 (4.9%): Egen fremføring

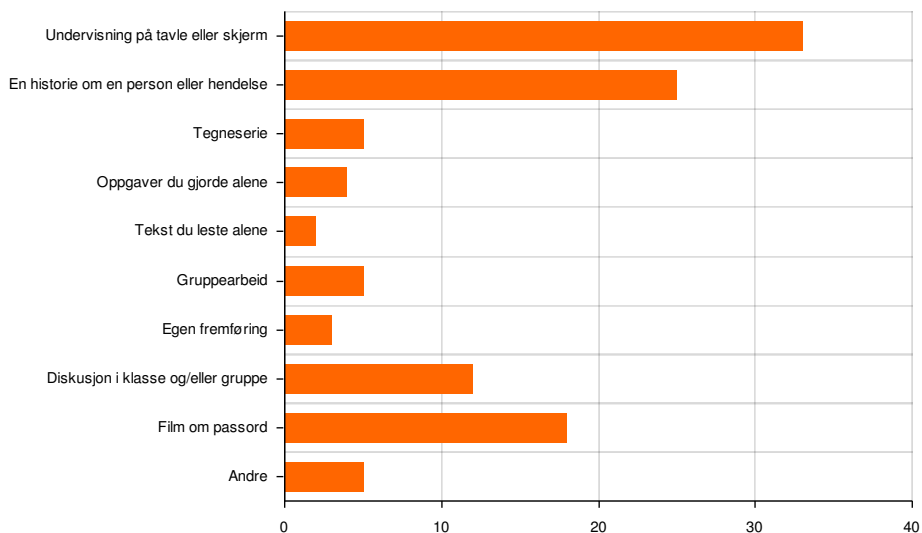
12 (19.7%): Diskusjon i klasse og/eller gruppe

18 (29.5%): Film om passord

5 (8.2%): Andre

Svar(er) fra ekstra feltet.:

- Så video på tavle og snakket i klassen
- husker ikke
- husker ikke
- husker ikke
- fordeler og ulemper



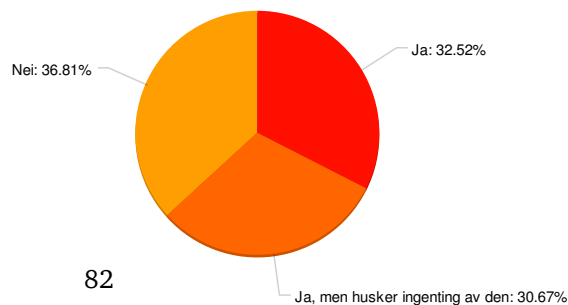
13. Har du hatt, eller kan du huske at du har hatt undervisning om personvern? *

Antall deltakere: 163

53 (32.5%): Ja

50 (30.7%): Ja, men husker ingenting av den

60 (36.8%): Nei



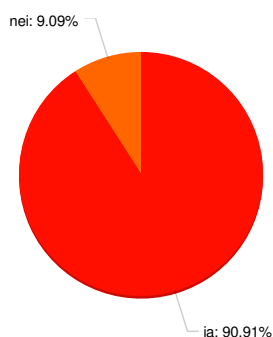
14. Var du fornøyd med undervisningen du fikk om personvern? *

Antall deltakere: 55

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

50 (90.9%): ja

5 (9.1%): nei



15. Hva besto undervisningen om personvern av?

Mangler et svar så skriver du det i "Annet" boksen.

Du kan velge flere svar. *

Antall deltakere: 54

30 (55.6%): Undervisning på tavle eller skjerm

17 (31.5%): En historie om en person eller hendelse

4 (7.4%): Tegneserie

4 (7.4%): Oppgaver du gjorde alene

4 (7.4%): Tekst du leste alene

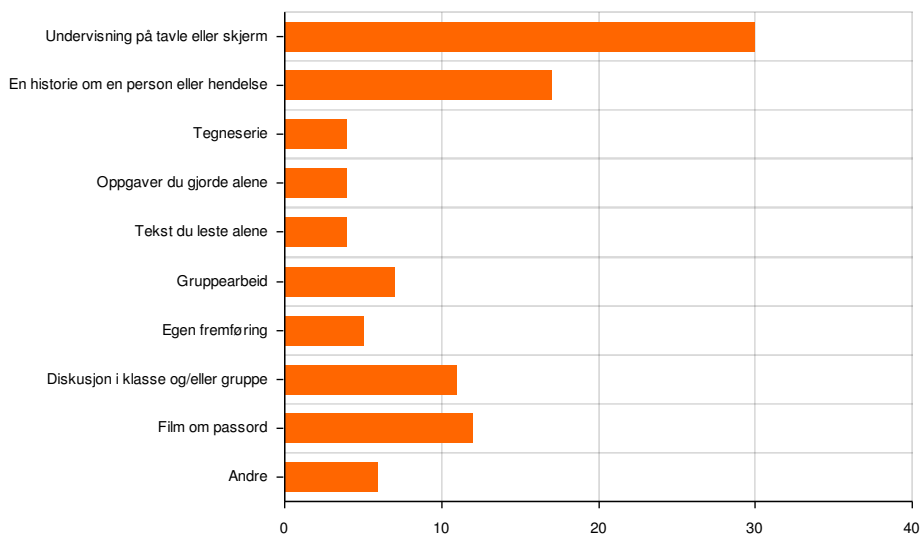
7 (13.0%): Gruppearbeid

5 (9.3%): Egen fremføring

11 (20.4%): Diskusjon i klasse og/eller gruppe

12 (22.2%): Film om passord

6 (11.1%): Andre



Svar(er) fra ekstra feltet.:

- Husker ikke
- husker ikke
- husker ikke
- Jeg husker ikke
- Opplysninger
- det var litt av hvert

16. Har du noen meninger om spørreundersøkelsen?

Antall deltakere: 74

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

 Vis alle 39 tidligere svar

- det var helt greit. det kunne vært flere alternativer med "kanskje" eller "vet ikke"
- få mer kanskje
- den var ok
- nope
- Den var bra.
- Den var bra laget:)
- nei
- Jeg synes det var bra med en undersøkelse. Da kan vi både hjelpe en som skal skrive en masteroppgave og lære litt mer nøye om det selv.
- ja, det høres smart ut, ja og altså prøve det ut og se på de forskjellige svarene eller like svarende.
- Den var fin:)
- Nei, Desverre.
- Den var ok
- nei
- Nei
- helt bra
- nei
- nei
- nei
- nei
- nei
- nei
- Den var bra!
- jeg synenes den var bra
- Litt rart
- Nei
- nei
- det var en bra undersøkelse
- det var spennende å ha en spørreundersøkelse som hjalp meg å tenke litt mer på nettvett.
- nei
- Jeg vet ikke helt. Med jeg syns at det var gøy:)
- nei
- den var greit siden man for mene vad man vill men jeg har aldri hat noen problemer eller blitt mobbet på nettet så jeg har egentlig ingen ting for å si
- nei dessverre.
- når du spør (har du hatt om personvern) så burde det ha vært
 - ja
 - nei
 - husker ikke
- Jeg syntes det var bra spørreundersøkelse.

Spørreskjema ETTER undervisning om passord i Comic-BEE

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

1. Hvor gammel er du?

Vil du ikke svare lar du feltet stå tomt.

Antall deltakere: 128

👁 Vis alle 93 tidligere svar

- 12

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2. Kjønn? *

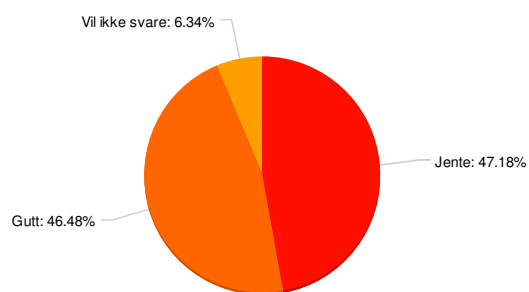
Antall deltakere: 142

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

67 (47.2%): Jente

66 (46.5%): Gutt

9 (6.3%): Vil ikke svare



3. Hvilken skole går du på?

Hvis du ikke ønsker å svare så lar du feltet være tomt.

Antall deltakere: 121

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective



4. Hvilken klasse går du i? *

Antall deltakere: 142

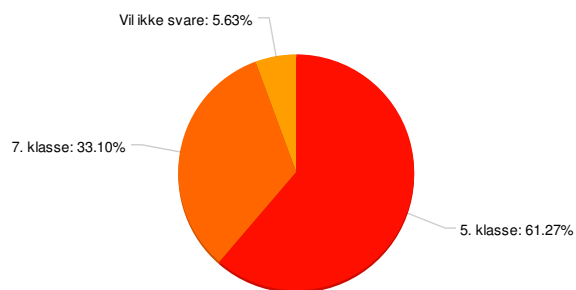
Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

87 (61.3%): 5. klasse

- (0.0%): 6. klasse

47 (33.1%): 7. klasse

8 (5.6%): Vil ikke svare



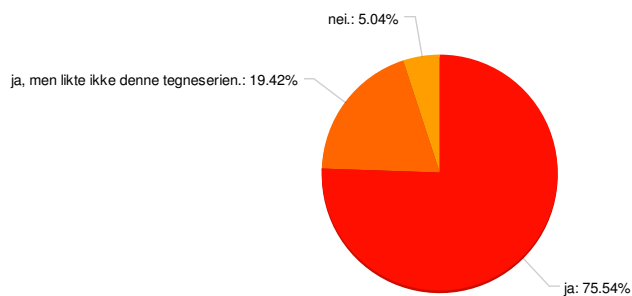
5. Likte du at du fikk tegneserie for å lære om passord? *

Antall deltakere: 139

105 (75.5%): ja

27 (19.4%): ja, men likte ikke denne tegneserien.

7 (5.0%): nei.



6. Hvor mange ganger leste du ferdig tegneserien? *

Antall deltakere: 139

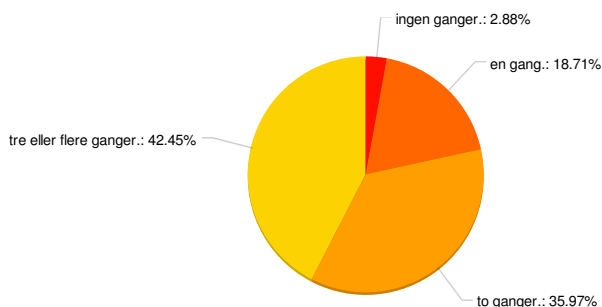
Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

4 (2.9%): **ingen ganger.**

26 (18.7%): **en gang.**

50 (36.0%): **to ganger.**

59 (42.4%): **tre eller flere ganger.**



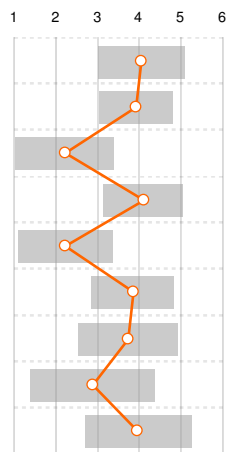
7. Her er det noen setninger om tegneserien. Du skal velge et svar på hver linje.

Det er ingen feil svar. Svar det du tenker her og nå. Er du for eksempel helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 136

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Vet ikke (6)		Ø	±
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%		
Det var enkelt å trykke s...	5x	3,68	4x	2,94	24x	17,65	52x	38,24	48x	35,29	3x	2,21	4,05	1,04
Det var lett å huske hist...	2x	1,47	5x	3,68	31x	22,79	64x	47,06	32x	23,53	2x	1,47	3,92	0,89
Innholdet var vanskelig å...	36x	26,47	63x	46,32	22x	16,18	5x	3,68	6x	4,41	4x	2,94	2,22	1,18
Tegneserier er bra for a...	3x	2,21	5x	3,68	20x	14,71	61x	44,85	42x	30,88	5x	3,68	4,10	0,97
Tegneserien var forvirre...	41x	30,15	48x	35,29	31x	22,79	10x	7,35	4x	2,94	2x	1,47	2,22	1,13
Tegneserien lærte meg ...	2x	1,47	8x	5,88	35x	25,74	61x	44,85	23x	16,91	7x	5,15	3,85	0,99
Jeg tror jeg vil huske hv...	6x	4,41	12x	8,82	39x	28,68	45x	33,09	24x	17,65	10x	7,35	3,73	1,20
Jeg vil endre noen av pa...	24x	17,65	44x	32,35	26x	19,12	19x	13,97	13x	9,56	10x	7,35	2,88	1,49
Jeg vil anbefale denne te...	7x	5,15	10x	7,35	26x	19,12	44x	32,35	35x	25,74	14x	10,29	3,97	1,28

■ Aritmetisk gjennomsnitt (Ø)
 Standard deviation (±)



8. Synes du at du lærte noe av tegneserien?

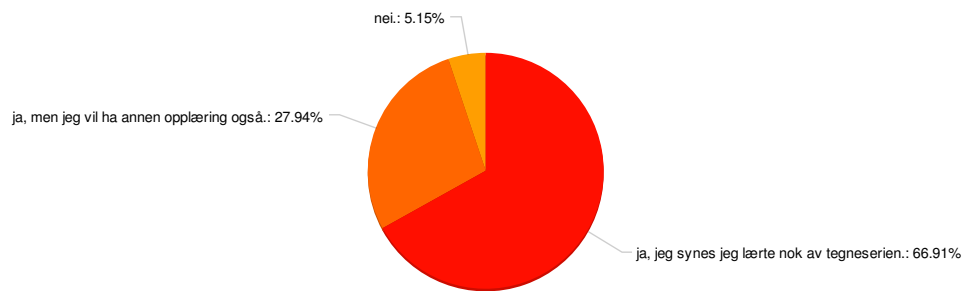
Annen opplæring kan være at læreren underviser, du leser bok eller har lekser. *

Antall deltakere: 136 Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

91 (66.9%): ja, jeg synes jeg lærte nok av tegneserien.

38 (27.9%): ja, men jeg vil ha annen opplæring også.

7 (5.1%): nei.



9. Hvis du vil ha annen undervisning også, hva skal det være?

Du kan velge flere svar. Mangler et svar så skriver du det i "Annet"-boksen. *

Antall deltakere: 45

9 (20.0%): læreren underviser.

1 (2.2%): vi får lekser.

1 (2.2%): lese en eller flere bøker.

34 (75.6%): se en film om passord.

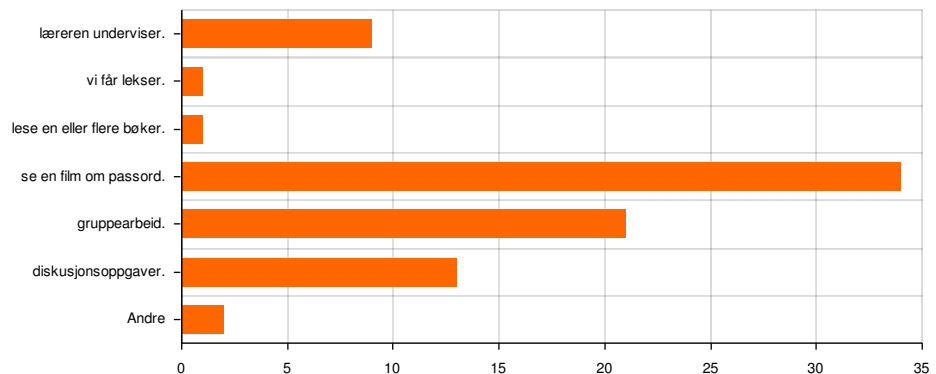
21 (46.7%): gruppearbeid.

13 (28.9%): diskusjonsoppgaver.

2 (4.4%): Andre

Svar(er) fra ekstra feltet.:

- flere valg i serie
- (teste) ut på en måte



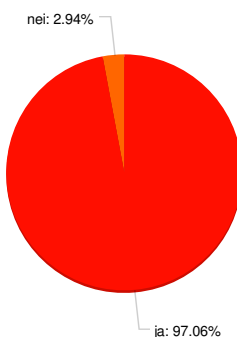
10. Husker du læreren Heidi fra tegneserien? *

Antall deltakere: 136

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

132 (97.1%): ja

4 (2.9%): nei



11. Svar hva du tenker om Heidi.

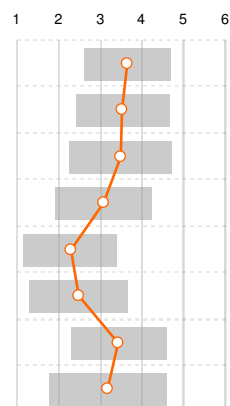
Du skal velge et svar på hver linje.

Det er ingen feil svar. Svar det du tenker her og nå. Er du for eksempel helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 130

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Vet ikke (6)		Ø	±
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%		
Jeg likte å lese hva Heid...	5x	3,85	8x	6,15	40x	30,77	59x	45,38	11x	8,46	7x	5,38	3,65	1,04
Jeg likte måten Heidi sn...	8x	6,15	10x	7,69	42x	32,31	50x	38,46	15x	11,54	5x	3,85	3,53	1,12
Heidi gjorde at jeg vil le...	4x	3,08	21x	16,15	47x	36,15	34x	26,15	13x	10,00	11x	8,46	3,49	1,22
Jeg syntes at Heidi gjord...	12x	9,23	27x	20,77	46x	35,38	33x	25,38	8x	6,15	4x	3,08	3,08	1,17
Det var mye Heidi sa som...	31x	23,85	57x	43,85	26x	20,00	7x	5,38	8x	6,15	1x	0,77	2,28	1,12
Det Heidi sa er vanskelig...	26x	20,00	51x	39,23	30x	23,08	15x	11,54	5x	3,85	3x	2,31	2,47	1,18
Jeg vil at Heidi brukes i a...	6x	4,62	18x	13,85	45x	34,62	45x	34,62	7x	5,38	9x	6,92	3,43	1,15
Heidi gjorde at jeg ville ...	15x	11,54	27x	20,77	44x	33,85	21x	16,15	10x	7,69	13x	10,00	3,18	1,42

■ Aritmetisk gjennomsnitt (Ø)
 Standard deviation (±)



12. Hvorfor tror du at du ikke husker karakteren Heidi?

Du kan velge flere svar. Mangler et svar skriver du dette i Annet-boksen. *

Antall deltakere: 4 Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

- (0.0%): Jeg klarte ikke å konsentrere meg.

3 (75.0%): Jeg syntes tegneserien var kjedelig.

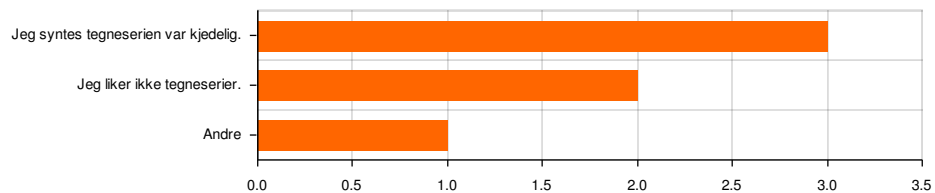
2 (50.0%): Jeg liker ikke tegneserier.

- (0.0%): Jeg leste ikke igjennom tegneserien.

1 (25.0%): Andre

Svar(er) fra ekstra feltet.:

- Husker ikke alt hun sa



13. Har du noen meninger om spørreundersøkelsen?

Antall deltakere: 49

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

👁 Vis alle 14 tidligere svar

- nei
- fint at dere har en nettvett spørreundersøkelse, det kan også hjelpe andre til å forstå mere om passord og nettvett.
- den var ok.
- Nei med det er litt gøy og svare på spørsmål og litt kjedelig.
- den var bra og lærte lit nyt
- den var kul!
- BRA
- nei jeg hat ingen meninger.....
- nei
- den var fin
- undersøkelsen var fin
- nei
- nei
- nei
- Det var fin spørreundersøkelse måten man kunne svare på var bra
- det er litt vanskelig og lese
- det var en bra spørreundersøkelse
- Nei
- NEI
- NEI
- nei!!:)
- nei
- nehomg bff love fpr li
- litt lett å svare på feil spørsmål siden de var så tett i tett.
- Nei
- Jeg synes det er litt bedre å ha tegneserie og kunne velge hva som skjer i den! Det var morsommere enn at læreren bare skal stå foran klassen og forklare det på en mer komplisert måte. Jeg tror jeg kan huske det bedre hvis vi lærer med tegneserie. Da har man også bilder så det blir lettere å huske.
- hvis du mener tegneseriens så var den litt kjedelig.
- Hvorfor ikke et annet navn.
- Ganske bra men Heidi hadde ikke noe personaltitet
- nei
- Nei
- Nei
- nei
- nei
- gøy
- Den var bra!
- nei

Spørreskjema ETTER undervisning om uønskede hendelser på internett i Comic-BEE

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

1. Hvor gammel er du?

Vil du ikke svare lar du feltet stå tomt.

Antall deltakere: 137

 Vis alle 102 tidligere svar

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2. Kjønn? *

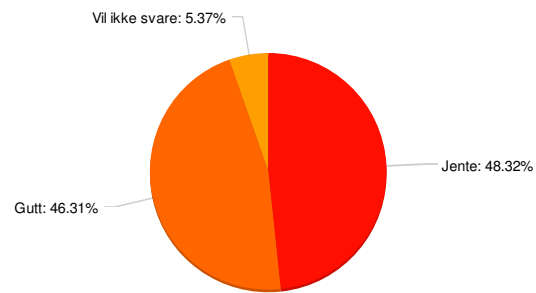
Antall deltakere: 149

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

72 (48.3%): **Jente**

69 (46.3%): **Gutt**

8 (5.4%): **Vil ikke svare**



3. Hvilken skole går du på?

Hvis du ikke ønsker å svare så lar du feltet være tomt.

Antall deltakere: 125

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective



4. Hvilken klasse går du i? *

Antall deltakere: 148

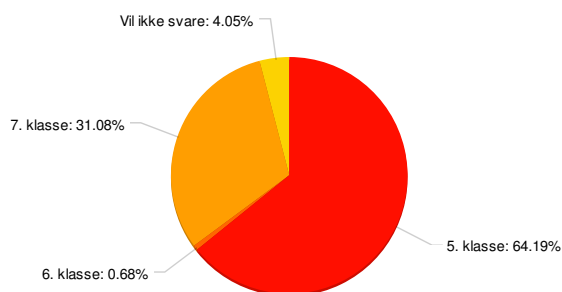
Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

95 (64.2%): 5. klasse

1 (0.7%): 6. klasse

46 (31.1%): 7. klasse

6 (4.1%): Vil ikke svare



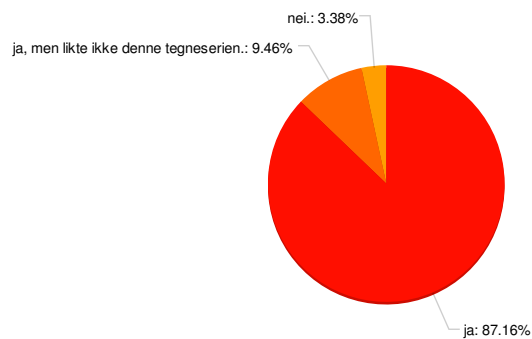
5. Likte du at du fikk tegneserie for å lære om uønskede hendelser på internett? *

Antall deltakere: 148

129 (87.2%): ja

14 (9.5%): ja, men likte ikke denne tegneserien.

5 (3.4%): nei.



6. Hvor mange ganger leste du ferdig tegneserien? *

Antall deltakere: 148

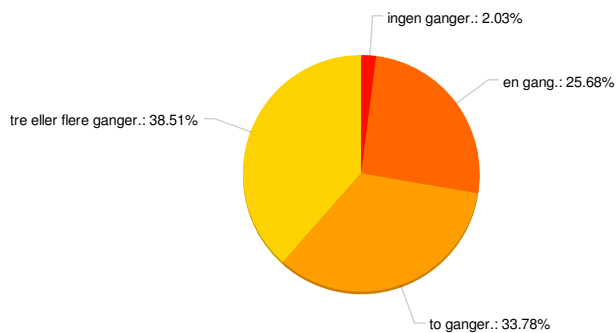
Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

3 (2.0%): **ingen ganger.**

38 (25.7%): **en gang.**

50 (33.8%): **to ganger.**

57 (38.5%): **tre eller flere ganger.**



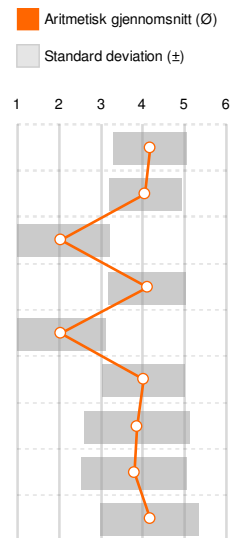
7. Her er det noen setninger om tegneserien.

Du skal velge et svar på hver linje.

Det er ingen feil svar. Svar det du tenker her og nå. Er du for eksempel helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 147

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Vet ikke (6)			
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Ø	±
Det var enkelt å trykke s...	2x	1,36	4x	2,72	19x	12,93	63x	42,86	57x	38,78	2x	1,36	4,19	0,88
Det var lett å huske hist...	2x	1,36	7x	4,76	16x	10,88	78x	53,06	43x	29,25	1x	0,68	4,06	0,86
Innholdet var vanskelig å...	51x	34,69	65x	44,22	14x	9,52	10x	6,80	4x	2,72	3x	2,04	2,05	1,14
Tegneserier er bra for a...	3x	2,04	6x	4,08	19x	12,93	67x	45,58	49x	33,33	3x	2,04	4,10	0,94
Tegneserien var forvirre...	48x	32,65	65x	44,22	22x	14,97	7x	4,76	2x	1,36	3x	2,04	2,04	1,06
Tegneserien lærte meg ...	3x	2,04	8x	5,44	22x	14,97	73x	49,66	34x	23,13	7x	4,76	4,01	0,99
Jeg tror jeg vil huske hv...	7x	4,76	14x	9,52	27x	18,37	60x	40,82	22x	14,97	17x	11,56	3,86	1,26
Jeg tror jeg vil reagere ...	6x	4,08	17x	11,56	33x	22,45	52x	35,37	23x	15,65	16x	10,88	3,80	1,27
Jeg vil anbefale denne te...	5x	3,40	5x	3,40	28x	19,05	50x	34,01	40x	27,21	19x	12,93	4,17	1,18



8. Synes du at du lærte noe av tegneserien?

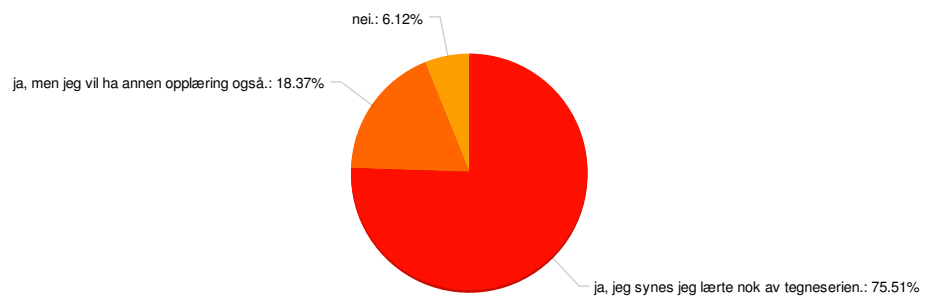
Annen opplæring kan være at læreren underviser, du leser bok eller har lekser. *

Antall deltakere: 147 Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

111 (75.5%): ja, jeg synes jeg lærte nok av tegneserien.

27 (18.4%): ja, men jeg vil ha annen opplæring også.

9 (6.1%): nei.



9. Hvis du vil ha annen undervisning også, hva skal det være?

Du kan velge flere svar. Mangler et svar så skriver du det i "Annet"-boksen. *

Antall deltakere: 36

6 (16.7%): læreren underviser.

2 (5.6%): vi får lekser.

3 (8.3%): lese en eller flere bøker.

27 (75.0%): se en film om uønskede hendelser på internett.

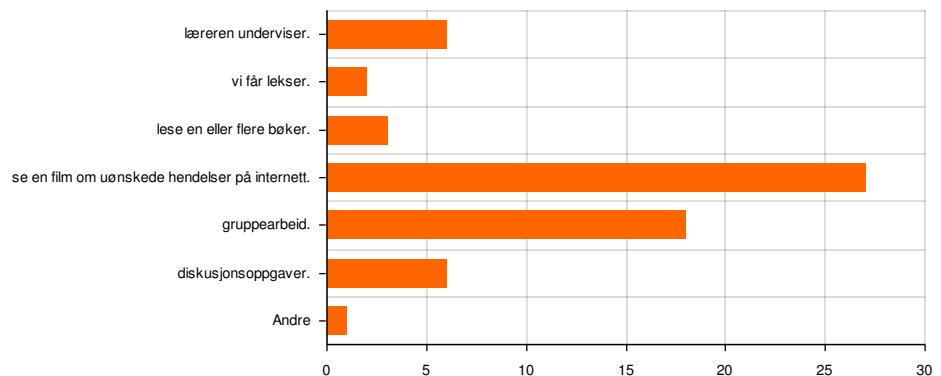
18 (50.0%): gruppearbeid.

6 (16.7%): diskusjonsoppgaver.

1 (2.8%): Andre

Svar(er) fra ekstra feltet.:

- Fremvising



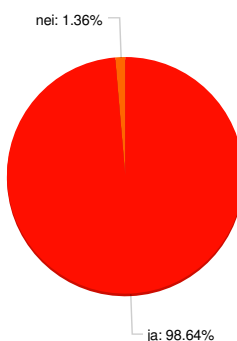
10. Husker du Nora fra tegneserien? *

Antall deltakere: 147

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

145 (98.6%): ja

2 (1.4%): nei



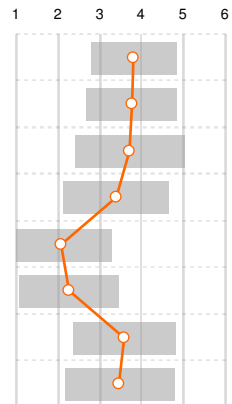
11. Svar hva du tenker om Nora. Du skal velge et svar på hver linje. Det er ingen feil svar. Svar det du tenker her og nå. Er du for eksempel helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 144

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Vet ikke (6)			
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Ø	±
Jeg likte å lese hva Nora...	4x	2,78	8x	5,56	36x	25,00	67x	46,53	22x	15,28	7x	4,86	3,81	1,02
Jeg likte måten Nora sna...	3x	2,08	10x	6,94	46x	31,94	56x	38,89	17x	11,81	12x	8,33	3,76	1,09
Nora gjorde at jeg vil le...	9x	6,25	14x	9,72	42x	29,17	36x	25,00	31x	21,53	12x	8,33	3,71	1,31
Jeg syntes at Nora gjord...	10x	6,94	21x	14,58	53x	36,81	30x	20,83	22x	15,28	8x	5,56	3,40	1,26
Det var mye Nora sa som...	54x	37,50	55x	38,19	18x	12,50	6x	4,17	8x	5,56	3x	2,08	2,08	1,23
Det Nora sa er vanskelig...	36x	25,00	69x	47,92	21x	14,58	8x	5,56	5x	3,47	5x	3,47	2,25	1,20
Jeg vil at Nora brukes i a...	9x	6,25	17x	11,81	41x	28,47	42x	29,17	28x	19,44	7x	4,86	3,58	1,24
Nora gjorde at jeg ville ...	11x	7,64	19x	13,19	50x	34,72	30x	20,83	25x	17,36	9x	6,25	3,46	1,31

■ Aritmetisk gjennomsnitt (Ø)

 Standard deviation (±)



12. Hvorfor tror du at du ikke husker karakteren Nora?

Du kan velge flere svar. Mangler et svar skriver du dette i Annet-boksen. *

Antall deltakere: 2 Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

- (0.0%): Jeg klarte ikke å konsentrere meg.

Jeg syntes tegneserien var kjedelig.



2 (100.0%): Jeg syntes tegneserien var kjedelig.

- (0.0%): Jeg liker ikke tegneserier.

- (0.0%): Jeg leste ikke igjennom tegneserien.

- (0.0%): Andre

13. Har du noen meninger om spørreundersøkelsen?

Antall deltakere: 47

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

👁 Vis alle 12 tidligere svar

- nei
- nei
- nå vet jeg mest sannsynlig hva jeg må gjøre i sånne situasjoner.
- nei
- veldig bra!
- j g b r også i myrsletta
- gode spørsmål og jeg liker undersøkelser! :)
- g,.see efr ,vbv bgn
- nei
- nei!!!!
- bra
- nei
- bra
- nei
- nei
- nei yeet yeet det er ekkelt
- Nei
- Bra spørreundersøkelse med gode spørsmål.
- Jeg likte tegneserien om Nora. Jeg likte også at hun sa at man kan kontakte slett.meg hvis noe lignende skjer med meg eller andre.
- Nora var mye mer menneskelig enn læreren.
- NEI
- Nei
- nei
- hva mener di med jeg likte stemmen til nora og Heidi
- helt bra
- den var bra
- jeg likte den!
- nei
- tegneserien burde vært lengere fordi det var veldig bra !
- NEI !!!!!!!!!!!!!
- Nei.
- ben var mye mer kjeldigere en den forie teksten og jeg kjønte nesten ikke noget av den men det er ikke rart jeg har dysleksi og det er vanskelig for meg.....
- det var spennende
- Det er en fin tegneserie.
- jeg vil lese mer tegneserier

Spørreskjema ETTER undervisning om personvern i Comic-BEE

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

1. Hvor gammel er du?

Vil du ikke svare lar du feltet stå tomt.

Antall deltakere: 132

 Vis alle 97 tidligere svar

- 12
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2. Kjønn? *

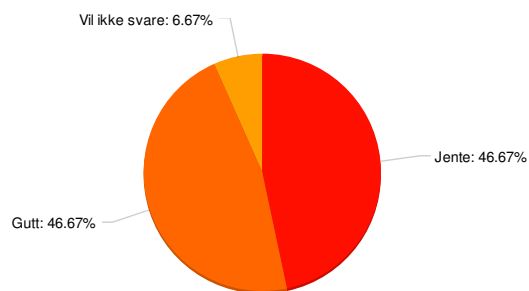
Antall deltakere: 150

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

70 (46.7%): Jente

70 (46.7%): Gutt

10 (6.7%): Vil ikke svare



3. Hvilken skole går du på?

Hvis du ikke ønsker å svare så lar du feltet være tomt.

Antall deltakere: 119

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective



4. Hvilken klasse går du i? *

Antall deltakere: 150

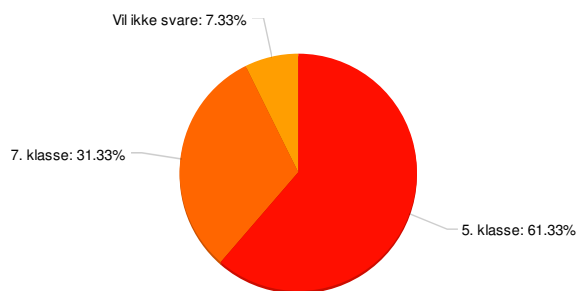
Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

92 (61.3%): 5. klasse

- (0.0%): 6. klasse

47 (31.3%): 7. klasse

11 (7.3%): Vil ikke svare



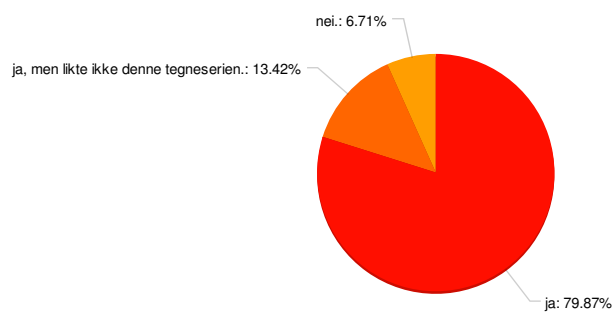
5. Likte du at du fikk tegneserie for å lære om deling av bilder? *

Antall deltakere: 149

119 (79.9%): ja

20 (13.4%): ja, men likte ikke denne tegneserien.

10 (6.7%): nei.



6. Hvor mange ganger leste du tegneserien ferdig? *

Antall deltakere: 149

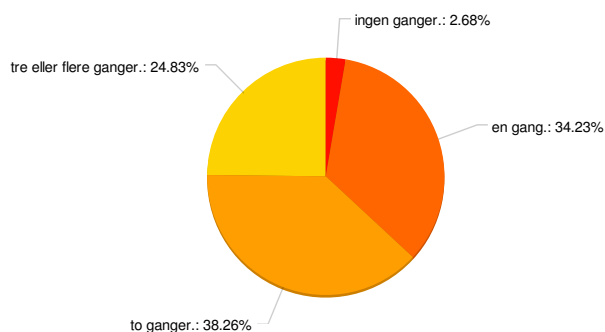
Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

4 (2.7%): **ingen ganger.**

51 (34.2%): **en gang.**

57 (38.3%): **to ganger.**

37 (24.8%): **tre eller flere ganger.**



7. Her er det noen setninger om tegneserien.

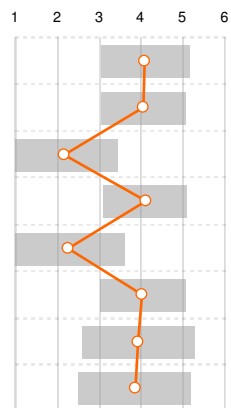
Du skal velge et svar på hver linje.

Det er ingen feil svar. Svar det du tenker her og nå. Er du for eksempel helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 149

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Vet ikke (6)			
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Ø	±
Det var enkelt å trykke s...	6x	4,03	4x	2,68	21x	14,09	65x	43,62	45x	30,20	8x	5,37	4,09	1,06
Det var lett å huske hist...	3x	2,01	9x	6,04	21x	14,09	69x	46,31	39x	26,17	8x	5,37	4,05	1,02
Innholdet var vanskelig.	51x	34,23	57x	38,26	24x	16,11	7x	4,70	2x	1,34	8x	5,37	2,17	1,29
Tegneserier er bra for a...	2x	1,34	6x	4,03	26x	17,45	64x	42,95	43x	28,86	8x	5,37	4,10	0,98
Tegneserien var forvirre...	48x	32,21	57x	38,26	22x	14,77	10x	6,71	3x	2,01	9x	6,04	2,26	1,35
Tegneserien lærte meg ...	3x	2,01	7x	4,70	28x	18,79	66x	44,30	35x	23,49	10x	6,71	4,03	1,03
Jeg tror jeg vil huske hv...	7x	4,70	14x	9,40	33x	22,15	46x	30,87	27x	18,12	22x	14,77	3,93	1,34
Jeg vil anbefale denne te...	13x	8,72	5x	3,36	34x	22,82	52x	34,90	29x	19,46	16x	10,74	3,85	1,33

■ Aritmetisk gjennomsnitt (Ø)
 Standard deviation (±)



8. Synes du at du lærte noe av tegneserien?

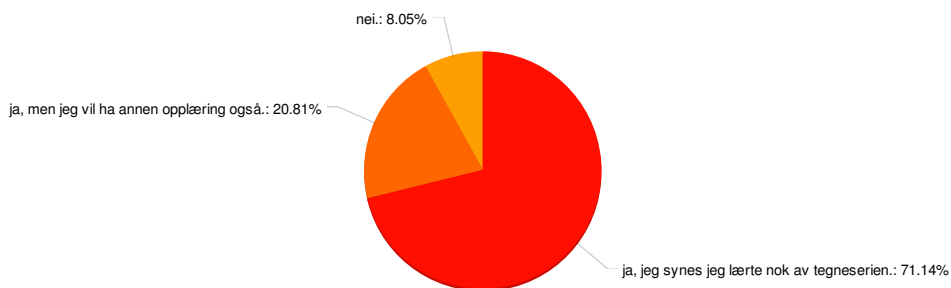
Annen opplæring kan være at læreren underviser, du leser bok eller har lekser. *

Antall deltakere: 149 Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

106 (71.1%): ja, jeg synes jeg lærte nok av tegneserien.

31 (20.8%): ja, men jeg vil ha annen opplæring også.

12 (8.1%): nei.



9. Hvis du vil ha annen undervisning også, hva skal det være?

Du kan velge flere svar. Mangler et svar så skriver du det i "Annet"-boksen. *

Antall deltakere: 43

11 (25.6%): læreren underviser.

4 (9.3%): vi får lekser.

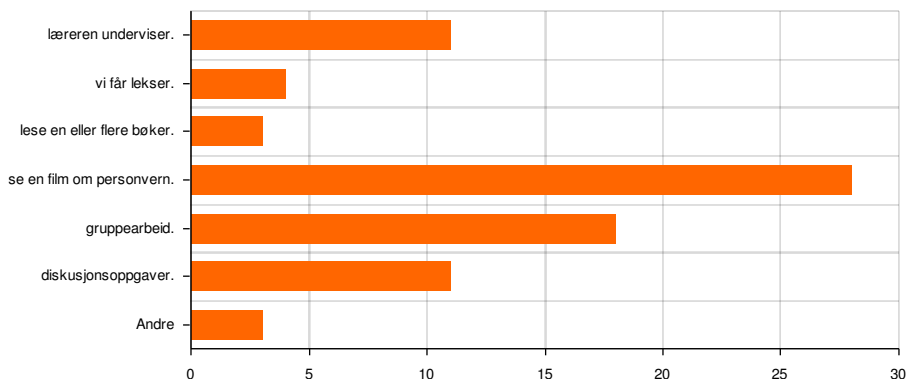
3 (7.0%): lese en eller flere bøker.

28 (65.1%): se en film om personvern.

18 (41.9%): gruppearbeid.

11 (25.6%): diskusjonsoppgaver.

3 (7.0%): Andre



Svar(er) fra ekstra feltet.:

- lage et skuespill om det!
- ser en film om en person dette skjer med
- læren snakker om det/viser det foran alle andre

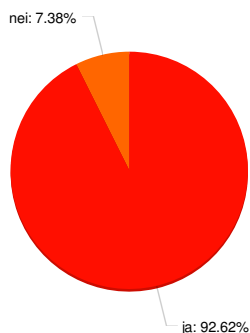
10. Husker du Mathias fra tegneserien? *

Antall deltakere: 149

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

138 (92.6%): ja

11 (7.4%): nei



11. Svar hva du tenker om Mathias.

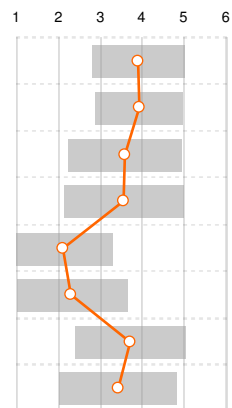
Du skal velge et svar på hver linje.

Det er ingen feil svar. Svar det du tenker her og nå. Er du for eksempel helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 138

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Vet ikke (6)		Ø	±	
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%			
Jeg likte å lese hva Math...	4x	2,90	8x	5,80	35x	25,36	52x	37,68	30x	21,74	9x	6,52	3,89	1,11	
Jeg likte måten Mathias ...	2x	1,45	6x	4,35	38x	27,54	59x	42,75	21x	15,22	12x	8,70	3,92	1,04	
Mathias gjorde at jeg vil...	8x	5,80	20x	14,49	41x	29,71	35x	25,36	19x	13,77	15x	10,87	3,59	1,35	
Jeg syntes at Mathias gjo...	10x	7,25	20x	14,49	46x	33,33	27x	19,57	16x	11,59	19x	13,77	3,55	1,43	
Det var mye Mathias sa s...	47x	34,06	58x	42,03	19x	13,77	6x	4,35	3x	2,17	5x	3,62	2,09	1,20	
Det Mathias sa er vanske...	37x	26,81	61x	44,20	22x	15,94	6x	4,35	3x	2,17	9x	6,52	2,30	1,33	
Jeg vil at Mathias brukes...	8x	5,80	14x	10,14	40x	28,99	42x	30,43	17x	12,32	17x	12,32	3,70	1,33	
Mathias gjorde at jeg vil...	8x	5,80	31x	22,46	42x	30,43	24x	17,39	18x	13,04	15x	10,87	3,42	1,40	

■ Aritmetisk gjennomsnitt (Ø)
■ Standard deviation (±)



12. Hvorfor tror du at du ikke husker karakteren Mathias?

Du kan velge flere svar. Mangler et svar skriver du dette i Annet-boksen. *

Antall deltakere: 12 Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

1 (8.3%): Jeg klarte ikke å konsentrere meg.

4 (33.3%): Jeg syntes tegneserien var kjedelig.

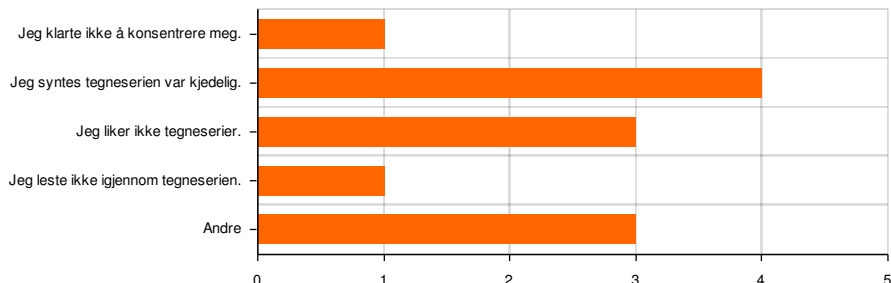
3 (25.0%): Jeg liker ikke tegneserier.

1 (8.3%): Jeg leste ikke igjennom tegneserien.

3 (25.0%): Andre

Svar(er) fra ekstra feltet.:

- jeg husker bare ikke
- 4jin34
- han var kjedelig



13. Her kommer det setninger om hva du tenker om nettvett. Nettvett er å være smart når du bruker nett, enten på mobil, nettbrett eller pc. Deling av bilder, passord og uønskede hendelser er alle en del av nettvett.

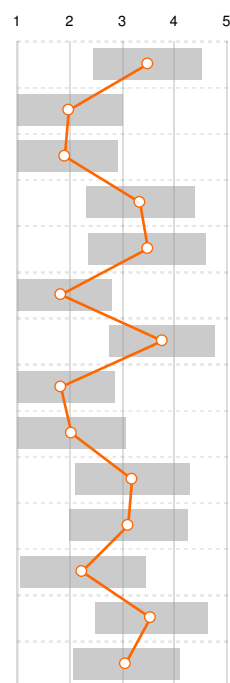
Du skal velge det svaret på hver linje som du er mest enig i.

Det er ingen feil svar. Svar det du tenker her og nå. Er du helt enig med setningen velger du "helt enig". Er du helt uenig velger du "helt uenig". *

Antall deltakere: 149

	Helt uenig (1)		Uenig (2)		Verken enig eller uenig (3)		Enig (4)		Helt enig (5)		Ø	±
	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%		
Nettvett er veldig intere...	8x	5,37	12x	8,05	50x	33,56	57x	38,26	22x	14,77	3,49	1,02
Jeg liker IKKE nettvett, o...	58x	38,93	49x	32,89	32x	21,48	6x	4,03	4x	2,68	1,99	1,01
Jeg synes det er ubehag...	63x	42,28	53x	35,57	23x	15,44	5x	3,36	5x	3,36	1,90	1,01
Nettvett er spennende o...	8x	5,37	17x	11,41	61x	40,94	42x	28,19	21x	14,09	3,34	1,03
Nettvett får meg til å fø...	12x	8,05	12x	8,05	46x	30,87	51x	34,23	28x	18,79	3,48	1,13
Nettvett får meg til å fø...	69x	46,31	51x	34,23	21x	14,09	3x	2,01	5x	3,36	1,82	0,98
Vanligvis synes jeg at ne...	7x	4,70	7x	4,70	32x	21,48	71x	47,65	32x	21,48	3,77	1,00
Når jeg hører ordet Nett...	68x	45,64	53x	35,57	19x	12,75	2x	1,34	7x	4,70	1,84	1,02
Jeg blir usikker når vi sk...	53x	35,57	54x	36,24	30x	20,13	7x	4,70	5x	3,36	2,04	1,03
Jeg liker veldig Nettvett.	12x	8,05	21x	14,09	60x	40,27	37x	24,83	19x	12,75	3,20	1,09
Jeg har alltid likt å lære...	13x	8,72	27x	18,12	59x	39,60	29x	19,46	21x	14,09	3,12	1,13
Jeg blir nervøs når jeg t...	49x	32,89	47x	31,54	31x	20,81	12x	8,05	10x	6,71	2,24	1,19
Jeg føler meg rolig når v...	9x	6,04	12x	8,05	44x	29,53	56x	37,58	28x	18,79	3,55	1,07
Jeg blir glad når jeg høre...	12x	8,05	21x	14,09	76x	51,01	25x	16,78	15x	10,07	3,07	1,02

Armetisk gjennomsnitt (Ø)
Standard deviation (±)



14. Har du noen meninger om spørreundersøkelsen?

Antall deltakere: 37

Evaluations of Cyber Security Education Material for School Students from a Transactional Analysis Perspective

 Vis alle 2 tidligere svar

- Nei
- Nei
- De andre var bedre
- Nei
- nei
- Det gikk fort å svare på spørsmålene.
- Jeg synes at undersøkelsen var bra, man kan lære mye av det man kanskje ikke visste fra før av.
- nei
- den var grei
- Bare bra ! men det om og dele bilder på nett er ikke bra lurt og ha privat . :)
- Nei egentlig ikke
- nei.
- nei
- nei
- den var fin
- nei
- nei
- nei
- kmkjmjhmjhmjjmjhhjhghggbj,.
- nei
- nei
- den var bra
- jei
- i de forskjellige undersøkelsene burde det være flere forskjellige spørsmål. Det blir enda kjedeligere når vi må svare på de samme 2-3 ganger
- Nei
- veldig bra spørsmål
- lang og kjedelig
- PEEEEEEEEWDIEEEEEEEEEPIEEEEEEEEEEe
- nei
- den var veldig inttresang
- nei
- nei
- nei
- dette er kjedeligt jeg lærer best av det nor en lærer snakker om det og ikke nor vi MÅ skrive det og lese det det er noet ungdommer kan jøre
- nei desverre