Information & Computer Security

Decoding audience interpretations of awareness campaign messages

Rayne Reid Johan Van Niekerk

Decoding audience interpretations of awareness campaign messages

Rayne Reid and Johan Van Niekerk
Institute of ICT Advancement, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa

Received 17 January 2016
Revised 17 January 2016
Accepted 9 March 2016

Abstract

Purpose – This research aims to determine whether the educational influence of the cybersecurity awareness campaign on the audience (their knowledge, behaviour and potential cybersecurity culture) matches the campaign's educational objectives. The research focuses on the knowledge component of this metric by examining the awareness campaign audience's interpretative role in processing the campaign content, through the lens of active audience theory (AAT).

Design/methodology/approach – Using reflective practices, this research examines a single longitudinal case study of a cybersecurity awareness and education campaign which aims to raise awareness amongst school learners. Artefacts from a single sample are examined.

Findings – Reflexive practices using theories such as active audience can assist in identifying deviations between the message a campaign intends to communicate and the message that the campaign audience receives.

Research limitations/implications – Using this research approach, measurements could only be obtained for campaign messages depicted in artefacts. Future interventions should be designed to facilitate a more rigorous analysis of the audiences' interpretation of all campaign messages using ATT.

Originality/value – This paper applied principles of ATT to examine the audience's interpretative role in processing an awareness campaign's content based on artifacts they created after exposure to the campaign. Conducting such analyses as part of a reflective process between cyber awareness/education campaign cycles provides a way to identify areas or topics within the campaign that require corrective action.

Keywords Case study, Action research, Active audience theory, Cyber security education, Reflective feedback, SACSAA

Paper type Research paper

1. Introduction

Most awareness campaigns are dependent on the underlying assumption that the audience will not misinterpret the campaign's message. This is not necessarily true. Measures must be taken to ensure that deviation in the interpretation of the campaign's intended message is detected and addressed appropriately within the campaigns' context.

The importance of awareness campaigns in fostering a cybersecurity culture is widely acknowledged. However, many campaigns assume that the audience will not misinterpret the message that the campaign is trying to communicate. This assumption may lead to undetected miscommunications or misunderstandings. A campaign should have measures in place to check that the audience is receiving the intended message. This paper examines one possible theory that could be used as such a measure.

Information & Computer Security
Vol. 24 No. 2, 2016
pp. 177-193

2056-4961
DOI 10.1108/ICS-01-2016-0003

The importance of ensuring that cybersecurity awareness campaigns are successfully communicating with their audience (thereby creating a consciously cyber-secure society) is directly proportional to the growth in the number of users interacting with the cyberspace.

In our technology- and information-infused world, cyberspace is an integral part of the modern-day society. In both personal and professional contexts, cyberspace is a highly effective tool in, and enabler of, most people's daily digitally transposed activities (Klimburg, 2012; Siponen, 2001; De Lange and Von Solms, 2012). Several countries' governments have recognized many potential benefits that the adoption of the internet and information and communications technology (ICT) may have for their country's welfare (Klimburg, 2012). Therefore, in many of these countries, citizens are being actively encouraged to adopt these technologies. South Africa itself has shown a rapid growth in cyber-active citizen population with the tally of active internet users (cybercitizens) growing from 2,400,000 in the year 2000 to 33,464,764 users in 2015 (IWS, 2015). This means that percentages of internet penetration in South Africa have grown from 5.5 per cent in 2000 to 61.1 per cent in 2015 (IWS, 2015).

This rapid adoption of cyber technologies and services has had some very positive results, e.g. providing users access to many beneficial and convenient services, utilities and opportunities for transacting, communicating, learning, socializing and many other activities. However, it has also had some negative and often unintended consequences. A prominent, problematic consequence is that the citizens are becoming increasingly technology-dependent, while also becoming increasingly vulnerable to cyber threats (Furnell *et al.*, 2007).

Cyber users can be exposed to a wide variety of threats, examples include technology- or hardware-oriented threats (e.g. malware, spyware and hacking), social- or human-oriented threats (e.g. cyber harassment, cyber-bullying, cyber stalking and social engineering attacks), content-related threats (e.g. inappropriate content, illicit content and manipulated content) and finally information or risk of exposure of information threats (e.g. oversharing or incautious sharing or accidental sharing of personal, private or otherwise valuable information). Within these threat categories, numerous specialized and constantly evolving threats exist. Even highly cyber-secure and -aware users will never be completely lacking vulnerabilities because of the constant evolution of known and unknown cyber threats.

As the number of active cyberspace users increases, the chances of a cyber threat finding a vulnerable target also increase. It is often argued that the average cyberspace citizen is not significantly aware of, or secured against, the many cyber threats targeting them. To avoid becoming victims of cyber threats, these cybercitizens urgently need to acquire the security and safety skills necessary for safe activity within cyberspace (Siponen, 2001).

All cyber users who are exposed to the risks of cyberspace must be educated about cybersecurity. However, this education is particularly important for children who interact with cyberspace from an early age (De Lange and Von Solms 2012; Reid and Van Niekerk 2014a; Von Solms and Von Solms 2014).

It is probable that the children of the current and future generations will interact with cyberspace in many roles and capacities throughout their lifetime. These children will therefore also require cybersecurity knowledge and behaviours throughout their lifetime. Cybersecurity practices should, thus, ideally be considered and taught as an

essential life skill for these children from the moment they begin interacting with cyberspace. Therefore, cybersecurity awareness campaigns and educational efforts which target children are required. These campaigns will be teaching the children knowledge and skills which will form their fundamental cybersecurity knowledge and skills. Therefore, it is extremely important that these campaigns communicate their content in a manner which encourages the target audience to receive and interpret the knowledge as intended by the campaigns' original content creators.

To determine whether a message is being communicated by the campaign and received and interpreted by the audience in the way it was intended requires a measurement of some sort. Ideally, the message, as it was intended to be sent (the original message), should be compared to the audience member's interpretation of the communicated message (the interpreted message). Such a comparison would provide valuable feedback, which contribute to the refinement and improvement of the campaign and its approaches. Therefore, a way to measure and compare the two messages is required. Currently, little or no literature specific to the interpretation of cybersecurity messages exists. It is therefore necessary to examine similar problems and their solutions for other fields of study which aim to communicate specific messages to audiences.

Several media and communication studies have focused on similar problems. In their field, the media (in various formats) aims to distribute various forms of messages. These messages can be targeted at either very broad or narrow audiences. One form of media which tries to communicate with its audience in a manner similar to that of an education campaign is television. Television programmes (factual or fictional) often attempt to convey specific messages and inferred meanings to their audiences. In the past, the program producers, like several awareness campaign creators, assumed that the meanings of a program's "texts" (messages) were being accepted unproblematically by their audiences (Barker, 2012). However, over time, they realized that this was not the case. Instead, they found suggestions that the audiences were actively interpreting and producing meaning from the "text" within their own cultural context. The research area pertaining to this phenomenon has become known as the active audience paradigm. Within this paradigm, there are a number of theories pertaining to how the meaning of the message is communicated and interpreted during the communication process between the "text" creator and the target audience.

Within the active audience paradigm (which forms part of the media and culture research area), there exists a prominent model, the encoding/decoding model, which was proposed by Hall (1980). This model considers the process of communicating a message as a circuit of meanings (of a text) because it goes through the process of being encoded and decoded in a communication circuit. At the end of the circuit, the model outlines a few different decoding positions an audience may fall into once they have interpreted a message that the communicator (e.g. a television show or an educational campaign) encoded and communicated. The authors believe that this model could be used, or adapted for use, in determining how a cybersecurity awareness campaign's audience is interpreting the campaign's intended message. Determining their interpretations, decoding positions could assist in detecting deviations or uniformity between the audience's interpretations of the meanings of the messages and the campaign's intended message meanings.

To examine this theory, this paper will analyze and discuss a campaign run by the South African Cyber Security Academic Alliance (SACSAA). SACSAA runs an annual cyber awareness campaign. Its aim is to promote and instil awareness of vital cybersecurity and safety knowledge and behaviours within and amongst the nation's school children. For the purposes of this research, the paper will examine whether the communication of its messages to its audience is done in a way that enables the children to understand the message as the campaign's content was intended to be understood.

This paper thus aims to use active audience theory (herein after "AAT") as a lens to determine whether the SACSAA campaign's target audience has been unambiguously and uncritically interpreting the meaning of the educational campaign's awareness themes (messages), as they were intended to be communicated by the campaign's creators. Detecting if the audience's interpretation deviates from the campaign's intended result may make it easier to identify the necessary adjustments needed to improve the communication of content for future campaign cycles.

The remainder of this paper is structured as follows: Section 2 provides more details about the SACSAA campaigns. Section 3 provides a brief explanation of the AAT paradigm. The research design used to meet this paper's aim is outlined in Section 4. Section 5 presents the findings of the paper. Finally, our work is concluded in Section 6.

2. The South African Cyber Security Academic Alliance campaign

The SACSAA consists of research groups from three well-known South African universities (SACSAA, 2011). The main objective of SACSAA is "to campaign for the effective delivery of cyber security awareness throughout South Africa to all groupings of the population" (SACSAA, 2011). Ultimately, SACSAA intends to aid in the fostering of a societal cybersecurity culture via education. This paper will focus on the data gathered from the SACSAA campaign activities involving the youth. SACSAA has officially run an annual educational cybersecurity campaign targeting the youth since 2012 (2011 had a pilot study). The campaign consists of two components – an education campaign and a poster contest.

The campaign aims to first raise the youth's general awareness of the need for cybersecurity in their digital activities. There are six main thematic messages in the campaign as follows:

(1) "Keep your private information private".
(2) "Be nice online".
(3) "Stay legal".
(4) "Trust an adult".
(5) "Protect your PC".
(6) "Stranger Danger".

A wide variety of cybersecurity and safety topics within these themes have been covered each year. These topics are presented using many modes and mediums.

Mass media is used to distribute messages and cultural forms (information) to large, widely dispersed, heterogeneous audiences (Munday and Chandler, 2011). The campaign presents each topic's content using multiple mass media modes, including digital media (awareness posters, videos, SACSAA website and online resources),

printed media (awareness posters, informational pamphlets, educational games (Reid and Van Niekerk 2013)) and finally public events (interactive school visits).

Each year the campaign has been modified to increase the effectiveness of the successive campaign's results and scalability. Changes and additions to the campaign have included the use of a pedagogical theory, use of multimedia and interactive presentations and multimodality in the campaign material, increased contextual customization, increased teacher involvement and inclusion of SACSAA's branding logos and mascots. Detailed discussions about the modifications and results from 2011 until 2013 are available in previous work (Van Niekerk *et al.* 2013; Reid and Van Niekerk 2014b). In 2014, the campaign was adapted to be more teacher-oriented, and a cybersecurity school curriculum was provided. In 2015, few changes were made apart from designing the expert talks to be more automated and media-centric.

The poster contest is the instrument used to measure the campaign's effect on the involved youth's awareness levels. Learners are invited to create and submit a hand-crafted or digital poster showing one or more awareness messages (as they understand it/them) for one or more of the campaign's topics. They are encouraged to draw the poster as if they were teaching the message to someone else. Participation in the competition is voluntarily and is encouraged through various prizes.

Evaluations of past campaign iterations' competition posters have shown that the majority of participants have moderately or fully internalized (learned from) the campaign messages. Posters indicated that internalization was: "partial" if the learner depicted the message as it was given, "moderate" if the lesson was rephrased into the learner's own words or "full" if the lesson was shown to be contextualized by the learner. This paper aims to determine whether the meanings of what the audiences internalized matche or resemble what the campaign objectives intended them to internalize.

Previous work has examined how the campaign has attempted to communicate messages and their meanings. The role of the audiences in this communication process and their interpretive role is yet to be examined. It is the authors' opinion that AAT could be used to understand the role of the campaign's target audience in interpreting the campaign's messages. The AAT paradigm is used for a similar purpose in the context of television (and other media) and culture studies, which have a similar communication intent towards the campaign. The next section will examine the AAT paradigm with a focus on Stuart Hall's encoding/decoding model.

3. Active audience theory paradigm

In cultural studies dealing with television and mass media, understanding the relationship between a media "text" and its audience (audience research) is very useful (Barker, 2012). In this field, the role of the audience is therefore a research focus.

There are many audience-related research areas, one of which is the audience's role in the "consumption" of media messages or texts. Audiences can be passive or active consumers. There are a number of models that address each theoretical stance. A passive audience model assumes that a text shared by the media will have a direct, predictable influence on a passive audience. Comparatively, an active audience model suggests that audiences interact with the text and actively create meaning from it based in their own cultural context (Barker, 2012).

Active audience theory examines the active, interpretative role of an audience when they "make meaning" from the media content based on their own cultural context (Hall,

1980; Munday and Chandler, 2011). The active audience paradigm suggests that it should not be assumed that audiences develop a culture by uncritically accepting the "textual" meaning of a programme (Barker, 2012).

Hall's (1980) encoding/decoding model suggests that an active audience has to decode the meanings within a text; therefore, different audiences will do so in different ways. A number of factors will influence how the audience interprets the text.

Audiences may interpret meanings from messages based on their own previously acquired cultural competencies, which they produced in the context of language and social relationships. This means that every member of an audience will have their contextual influences when they interpret a meaning from a message.

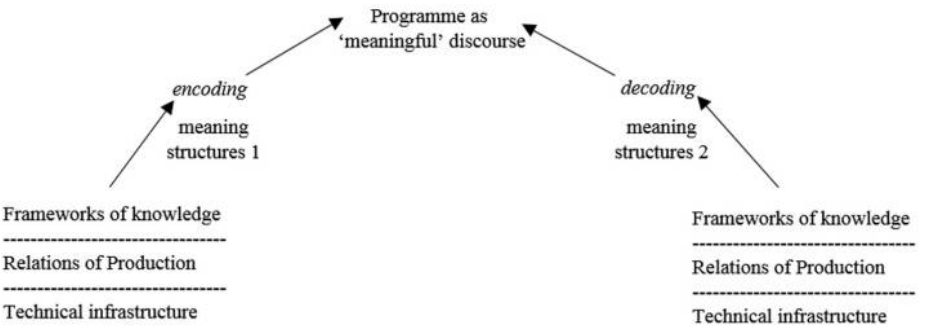
For the purpose of the encoding/decoding model, an audience is considered to be a group of socially situated individuals whose "reading" of the "text" will be framed by shared cultural meanings and practices.

Stuart Hall examined the process of communicating and interpreting meaning of messages in the "conversation" between the "text" creator and the target audience.

The aim of a media "text" is typically to communicate a message with a specific meaning. The process of communication consists of a circuit of a complex structure of relations, namely, production ≫ circulation ≫ distribution/consumption ≫ reproduction of a message (Hall, 1980).

Within this circuit of communication, messages are sent between parties. Typically, the message has a meaning that the sender tries to convey when constructing and producing the message. However, as the message moves within the circuit, it is not guaranteed that each level interprets (consumes) the meaning of the message similarly. This is because the meaning of a message is polysemic (can intentionally or unintentionally have multiple meanings), and an audience can interpret these meanings in different ways. Hall's (1980) encoding/decoding model (Figure 1) illustrates this by showing the discourses of the meaning of the text between its producer (encoder) and the reader (encoder). Hall's work is conducted in the context of media and culture studies.

Hall argues that media has a preferred message to communicate with their audience. The preferred message's text would be structured and presented in a "dominance-" encoding position to lead the audience to the preferred meaning (Hall, 1980; Barker, 2012). However, this does not guarantee consumption of the encoders'



Source: Hall (1980)

Figure 1.
Meaningful discourse

preferred meaning by the audience because audiences do not passively accept information and its imposed meanings from a structured "text" (Munday and Chandler, 2011).

Within the circuit of communication, the encoding/decoding model shows that audiences are active and knowledgeable producers of the meaning of a text's delivered message within their personal and social contexts (Barker, 2012). The producer (encoder) encodes meaning in a certain way, whereas the reader (decoder) decodes it differently according to their own personal knowledge and contextual frames of interpretation. It cannot be assumed that the meaning of a program, text or any other communication has a fixed interpretable meaning, which can unerringly be recognized by any audience. Instead, how the audience makes sense of a text's meaning is "the product of a negotiation between the audience and the *text* in a particular context of reception" (Munday and Chandler, 2011).

The audience and the producers/encoders of a message are expected to share the interpreted meaning positions to the same degree that they share cultural codes (Barker, 2012). To increase the amount of shared meanings, it is therefore very important when developing material or communicating a message that it be developed or communicated to try to apply and leverage similar or shared socially situated knowledge and practices in the communication of the messages.

In brief, different audiences (and the encoders) may accept different textual meanings, based on how the text is constructed and communicated and based on their contextual cultural influences. Texts (the messages) are polysemic (can have multiple meanings) (Hall, 1980). Often, only some of the meanings will be accepted by an audience (Barker, 2012). The audience's decoding will typically fall into one of the following three hypothetical decoding positions as proposed by Hall:

(1) "The dominant–hegemonic encoding/decoding" position – where the decoder accepts the messages' "preferred meanings" which a text is attempting to impose (Hall, 1980). Often this position is adopted, as the text usually reflects the ideas and beliefs of the audience, e.g. the subject matter may be the reason or relate strongly to a reason the audience member is interested in or it may affect their life or activities to some degree.

(2) "A negotiated code" position – wherein the decoder acknowledges the legitimacy of the theory of the hegemonic decoding, but adapts its interpretation based on particular circumstances or context (Hall, 1980). This position is adopted when an audience member understands the meaning of the text, but it does not relate to them in a degree of interest which would motivate them to further decode its meaning, e.g. the audience member may acknowledge the importance of a concept, but because they do not need to apply it in their lifestyle of activities, they may not require knowledge of specific details.

(3) "An oppositional code where audience members understand the preferred encoding may reject it and decode the text in contrary ways" (Hall, 1980). In this position, an audience member consciously rejects the preferred meaning and/or consciously or unconsciously relates to an opposing view. For example, the text's message provides the positive information about a particular issue; however, the audience relates better to the negatives of the same issue.

All positions are the result of the whole communication process and the audience members' decoding of the text to produce their own meaning of the message.

The campaigns make use of a variety of mass media to communicate. Additionally, the campaign and mass media have similar intents of communicating a message with a preferred meaning or interpretation. Consequently, the authors believe that it is possible to use the encoding/decoding model to analyze an awareness campaign's audience's interpretation of a campaign's messages. Therefore, the next section will outline how to conduct such an analysis.

4. Research design

This section presents the research design for how Hall's encoding/decoding model could be used in an analysis of the SACSAA campaign's audience's interpretation of its messages. Determining the decoding position espoused by the majority of the SACSAA campaign's audience's takes, could indicate what elements of the campaign are successfully or unsuccessfully meeting campaign objectives. In addition, it could indicate in the long-term what type of culture the campaign is encouraging to develop.

The annual SACSAA educational campaign has been running since 2011 as a longitudinal case study. Its intended long-term target audience is all South African youth. However, thus far, data have only been gathered from the numerous schools in the Nelson Mandela Metropolitan area which have been increasingly exposed to the campaign. The campaign aims to contribute to the fostering of a cybersecurity culture through the education of the youth. This paper aims to determine whether the targeted youths' understanding of the cybersecurity messages delivered matches the objectives of the campaign and will thus have the desired cultural effect. Part of the campaign's enhancements over the years has been the customization of the material to fit the issues of each particular school. Therefore, to measure an effect on an audience and its culture, it would be best to examine one particular audience and context, i.e. one school which has been exposed to the campaign for several successive years. Therefore, for the purposes of this paper, only data gathered from the single school that participated in every campaign since 2012 until 2015 (last complete campaign) will be used. This school will be referred to as "School A".

The campaign data used in this study were gathered prior to the conceptualization of this paper's research topic. In fact, it was the authors' perception of certain messages being misinterpreted by the audience in this campaign that lead to an investigation into theories that could be used to measure such misunderstanding. Therefore, the data gathering instrument and parameters were not specifically designed for this research report. The data used are relevant to the study; however, it may not be as complete as it could have been had the data gathering process been designed specifically for this research's purposes. Future research will make use of customized research design and implementation procedures and instruments to gather a more complete and suitable data set.

"School A" is a convenient and purposive sample for the analysis purpose of this paper. First, it is a convenience sample, as the data were "available to the researcher by means of its accessibility" (Bryman, 2012). The researchers have been gathering data for a number of successive years for research purposes. Second, this sample is also purposive as the sample participants were specifically selected "so that those sampled are relevant to the research questions that are being posed" (Bryman, 2012).

Over the years, the campaign material and approach has altered and improved. These changes were implemented for a variety of reasons, including to improve the effectiveness of the campaign, to create brand awareness, to increase message internalization and to address previously identified campaign faults or research gaps (Reid and Van Niekerk 2014b; Reid and Van Niekerk 2014a; Reid and van Niekerk 2014; Van Niekerk *et al.* 2013). This paper's research examines the audience's interpretations of campaign's content. The changes in measurements of the audience's interpretations, acceptance or rejections of the content may have been influenced by the changes made to the campaign overtime. Therefore, the changes made over within each research cycle will be briefly outlined in Table I.

The students within "School A" have been exposed to all of the involved culture-fostering and measurement activities and have, thus, been exposed to all the various adaptions made to the campaign. The sample is believed to be representative of the SACSAA campaign's general target audience's primary school subgroup for the following reasons: the participants are all primary school children, their age ranges between 6 and 15 years, members of both the genders participated and different ethnic groups were represented. Because of ethical considerations, no identifying data apart from participant age were captured.

A content analysis, as described by Krippendorff (2004), was done to determine if the audience's interpretation of the material aligned with the subject expert and educator's intended key messages for each campaign topic. A content analysis can be conducted on texts and artefacts (Hodder, 1994). The posters submitted by learners to the SACSAA campaign's competition are considered to be texts and artefacts. They illustrate how each learner understood the campaign's messages and how they had interpreted them.

The researchers consider the SACSAA campaign's competition posters to be iconic cultural artefacts, which provide information about the culture of their creators. Therefore, the analysis was conducted on the competition posters gathered from "School A". The aim was to determine if the learner's interpretation of the educational message matched or closely related. The interpretations could be aligned to one of Hall's three decoding positions depending upon whether it generally agreed with minor differences in interpretation or opposed the campaign's intended meanings. For the purposes of this paper, a fourth decoding position could be "null", wherein the audience members did not understand/accept/process the message clearly enough to take any of the above positions. This additional position is deemed necessary because of the very young age of some members of the specific campaign's intended audience.

For this analysis, the following questions were asked for each poster:

Q1. "What topic(s) do the message(s) in the poster cover?"

Q2. "What position within Hall's encoding/decoding theory did the audience member (poster creator) take once they decoded the campaign's message (in the researcher's opinion)?"

Each of these questions and the analysis process for answering them will briefly be elaborated upon in the next two subsections.

4.1 Posters per topic

This question was to determine which specific topics were considered as more important or accepted more readily by the learners. The campaign covered all of its

Campaign year	Changes/adjustments made to campaign
2011	Pilot study
	Distance learning campaign
	Informational pamphlets were distributed for topics of interest
	Participants were required to self-motivate and self-study with the given and additional materials
	Cash prizes were offered for the competition winners
2012	Self-study requirements were reduced
	A researcher or subject expert gave a formal informational talk at the schools. The presentations were customized to include example within topics, which were more relevant to the addressed learners and audience age-groups
	Pamphlets and additional online SACSAA reinforcement materials, including cybersecurity games were provided to the schools
	Brain-compatible education pedagogical principles were applied to all materials and educational experiences
	A campaign mascot (Cyber Sid) was introduced
	Generous (non-cash) prizes were offered for the competition winners
2013	A researcher or subject expert gave a formal informational talk at the schools–the presentations were customized for each school. Teachers could pre-request more detailed discussions about topics they knew were affecting learners at their school
	Pamphlets and additional reinforcement materials, including cybersecurity games were provided to the school's teachers to use in other lessons or follow-up discussions. These materials were also customized for each school
	Teachers were asked to encourage student participation in the competition
	The brain-compatible education pedagogical principles were applied to all materials and educational experiences
	The Cyber Sid mascot was replaced by the SACSAA logo on all the provided material
	Generous (non-cash) prizes were offered for the competition winners
2014	A researcher or subject expert gave a formal informational talk at the schools–the presentations were extremely customized and contextualized for each school. Anonymized stories (from the context of the schools) which had been provided by teachers were included in the talk to increase relatability and relevance for the target audience
	Pamphlets and additional online reinforcement materials, including cybersecurity games were provided to the school's teachers to use in other lessons or discussions
	Teachers were asked to encourage student participation in the competition
	Teachers were provided a complete, customizable cybersecurity education curriculum for the various age-groups. Additionally, they were invited to a workshop where they were provided training for the use of the curriculum
	The brain-compatible education pedagogical principles were applied to all materials and educational experiences
	Both the Cyber Sid mascot and the SACSAA logo were used within the provided material
	An additional campaign mascot (Cyber Sindi) was introduced to be inclusive of both genders
	Generous (non-cash) prizes were offered for the competition winners

(*continued*)

Table I.
Changes or adjustments made to annual cybersecurity awareness campaign

Campaign year	Changes/adjustments made to campaign
2015	A researcher or subject expert gave a formal informational talk at the schools – however, the talks were changed to reduce the expert's speech and increase the amount of media (videos, infographics, etc.) within the presentations. The customization of the presentations was less extreme than the previous year, returning to 2013's levels of customization Both mascots, Cyber Sid and Cyber Sindi, and the SACSAA logo were used within the provided material The campaign was run at a later time in the academic calendar The remainder of the campaign was identical to the previous year's campaign, excluding the running of a teacher's workshop

Table I.

topics well; however, it placed emphasis (considerable content) on the issues it considered as critical issues. These thematic issues' messages are: promoting anti-cyberbullying, PC and information protection and staying legal online. The percentage of posters covering a topic will be compared to that of the campaign's content which covered the topic. The difference between the percentages could indicate a match or difference between the audience's and campaign's rating of importance for the covered issues.

4.2 Poster creators' decoding position on the related campaign topic's message (according to Hall's encoding/decoding theory)

This question was asked to determine if the way the participant interpreted the message of the material aligned with how the campaign intended it to be understood. The participant's interpretation of the campaign topic(s)'s message(s) (as shown in their poster) was categorized as having one of the following positions: the dominant–hegemonic decoding position, a negotiated coded position or an oppositional coded position. These positions' meanings according to Stuart Hall are explained in Section 3. To determine which of these positions a poster belonged to, the following questions were asked as an evaluation matrix:

Q1. Does the poster's textual message support the related campaign's topic(s) message?

Q2. Does the poster's graphical message (examples/warnings) support the related campaign's topic(s) message?

Q3. What overall impression (in the researcher's opinion) does the poster give of the participants' interpretation of the related campaign's topic(s) message?

The answers to these questions were selected to be one of the following: strongly supports related campaign topic's message, partially/vaguely supports related campaign topic's message, opposed related campaign topic's message and undeterminable. If two or more questions were answered as strongly supporting the related campaign topic's message, the poster was classified as having accepted the dominant–hegemonic decoding interpretive position. Likewise, if two or more questions were answered as strongly opposing the related campaign topic's message, the poster was classified as having accepted an oppositional

coded interpretive position. Other combinations of answers resulted in the poster being classified as having accepted a negotiated coded interpretive position, unless two or more questions were answered as "undeterminable", in which case, the posters were classified as having a "null" or "undetermined" position. "Null" position posters were typically considered impossible to interpret without further information. An example of the results of using this matrix may for classification purposes is shown in Figure 2.

An example of a poster which is categorized as accepting the dominant–hegemonic (preferred) encoding/decoding of the campaign's message for the topic of cyberbullying is shown in Figure 2(a). The text strongly supports prevention and stopping of cyberbullying and provides tips on how to do this. The graphics strongly support the message, e.g. it shows the consequences (emotional pain) of the cyberbullying on the victim and the platforms this bullying may occur on. Overall, the poster strongly suggests that the participant agrees with the campaign's objective of promoting the prevention of being a cyberbully and/or victim of cyberbullying.

In contrast to Figure 2(a), II(b) shows an example of a poster which is categorized as representing an oppositional coded interpretative position for cyberbullying topic. The textual message was classified as being oppositional because it did not discourage cyberbullying in anyway, instead it seemed to say that cyberbullying is inevitable and its consequences should be disregarded. The graphical pictures illustrated an example of cyberbullying, but it did not indicate that it should be stopped or that it was bad; therefore, they were also classified as being oppositional. Overall, the poster seemed to promote cyberbullying rather than discourage it.

As discussed in the introduction, measuring the audience's decoding position concerning the meaning of the subject depicted in their posters fulfills the purpose of this research by determining if the educational influence of the cybersecurity awareness campaign on the audience's cybersecurity knowledge and awareness levels matches the campaign's educational objectives.

The remainder of this paper will discuss the results of the quantitative analysis. It will then conclude with the paper's findings in terms of its aim.

(a) (b)

Notes: (a) Dominant–hegemonic decoding of campaign topic message; (b) oppositional coding of campaign topic's message

Figure 2.
Examples of classification of poster interpretaion positions

5. Analysis and results

This analysis aims to determine whether the messages received by the audiences match the campaign's intended messages and thereby helps to foster the desired culture. This section will first present the general information about School A's submissions. Then, it will present discussions of the results of the analysis of the submissions based on the AAT analysis matrix previously discussed in Section 4.

The analyses conducted cover all of the posters submitted each year. Excluding the pilot study year, School A has participated in every SACSAA cyber awareness/education campaign and competition. In total, from 2012 to the 2015 campaign, School A has had 362 learners who voluntarily and successfully participated in the SACSAA poster completion. Figure 3 shows the participation numbers for each year. Overall, the school's learner participation tally has shown a positive trend of growth.

The next two subsections will conduct the analyses on the data gathered from these posters.

5.1 Analysis of posters per topic per annum

This section discusses the analysis of the percentage of total posters which depicted the messages of the campaign topics for each year. The poster competition required one or more message/s or topic/s to be covered within their poster entry. This analysis will reflect which topics the audiences consider important. Figure 4 shows the historic percentage tallies of how many posters covered each topic's messages each year. Most of the posters through the years have had covered singular themes or topics; however, some posters have addressed multiple topics. The percentages of each year's posters which covered multiple topics each year are as follows: 2012 – 14 per cent; 2013 – 38.24 per cent; 2014 – 16.67 per cent and 2015 – 15 per cent.

Based on Figure 4, posters have constantly reflected that learners strongly consider the topics of "cyberbullying", "information/password security" and "Virus & Malware" to be particularly important. Contrastingly, they show almost no regard for the topic of "Piracy", particularly the material view of promoting "anti-piracy" messages. The remainder of the topics had varied states of depiction over the years.

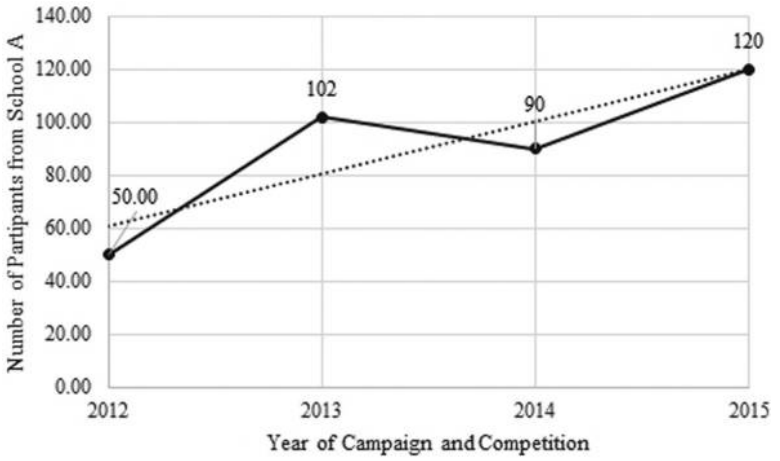


Figure 3.
Learner participation per year

These four messages were all strongly focussed on as serious issues in all of the campaign material because they are issues which are strongly associated with children's cyber activities. The audience seems to agree with the campaign about the importance of personal and asset security and safety. These benefit from this knowledge and associated practices. However, they reject the campaign's view that piracy and infringement of others individual's/entities property rights should be stopped (particularly if they benefit from the infringement).

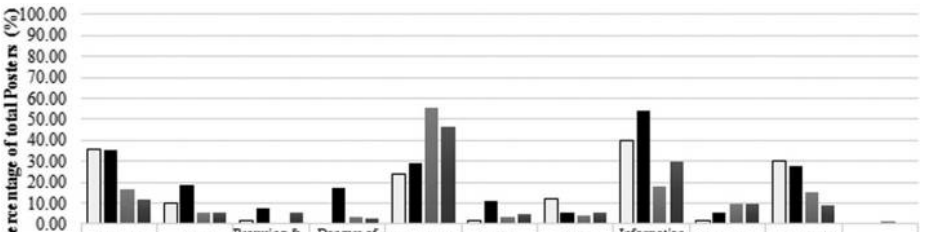
5.2 Analysis of the decoding positions indicated by the campaign audience's posters each year

This analysis examines which interpretive position based on the AAT matrix the participant's posters indicate the learners have taken. For the topics which have been depicted in the posters, this measurement could indicate whether the audience's and the campaign's interpretations of the message meanings are synching or deviating. Figure 5 displays the percentage of posters (learners) per AAT decoding position within each topic category for which they had depicted a message. Using Figure 5 the remainder of this section will discuss the finding in terms of the AAT decoding positions.

5.2.1 "The dominant–hegemonic encoding/decoding" model. The topics which have been consistently decoded each year are stranger danger, social networking, cyberbullying, cyber citizenship, cybercrime and information/password security. Other topics, which have had high depiction rates but have fluctuated yearly, are: browsing and downloading (2012, 2013 and 2015), danger of online activities (2013 and 2015) and hardware security (2013-2015). Piracy was the least depicted topic and never showed a dominant interpretation.

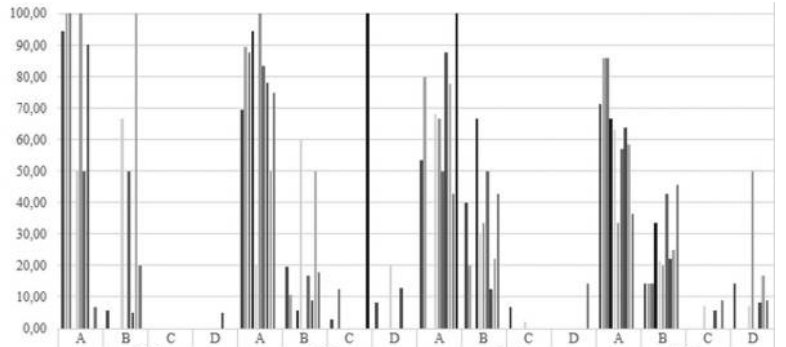
When the campaign has large quantities of posters in this decoding position, it indicates that although there is some room for improvement (until it is 100 per cent), this message does have message texts which are being successfully communicated. This interpretation could be held for the following reasons: first, they are very relatable and relevant issues for the target audience and second, it is extensively covered by the material.

The contributions of the material coverage and customization can be controlled by the campaign creators. Therefore, lessons from the topics' presentation and communication from the years they were most dominantly interpreted should be



	Stranger Danger	Social Networking	Browsing & Downloading	Dangers of Online activities	Cyberbullying	Cyber Citizenship	Cyber Crime	Information & Password Security	Hardware Security	Viruses & malware	Piracy
2012	36.00	10.00	2.00	0.00	24.00	2.00	12.00	40.00	2.00	30.00	0.00
2013	35.29	18.63	7.84	17.65	29.41	10.78	5.88	53.92	5.88	27.45	0.98
2014	16.67	5.56	0.00	3.33	55.56	3.33	4.44	17.78	10.00	15.56	1.11
2015	11.67	5.83	5.83	2.50	46.67	5.00	5.83	30.00	10.00	9.17	0.00

Figure 4.
Percentage of posters covering a topic's messages per annum (%)



	2012				2013				2014				2015			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Stranger Danger	94,44	5,56	0,00	0,00	69,44	19,44	2,78	8,33	53,33	40,00	6,67	0,00	71,43	14,29	0,00	14,29
Social Networking	100,00	0,00	0,00	0,00	89,47	10,53	0,00	0,00	80,00	20,00	0,00	0,00	85,71	14,29	0,00	0,00
Browsing and Downloading	100,00	0,00	0,00	0,00	87,50	0,00	12,50	0,00	0,00	0,00	0,00	0,00	85,71	14,29	0,00	0,00
Dangers of Online activities	0,00	0,00	0,00	0,00	94,44	5,56	0,00	0,00	0,00	66,67	0,00	0,00	66,67	33,33	0,00	0,00
Cyberbullying	50,00	66,67	0,00	0,00	20,00	60,00	0,00	20,00	68,00	30,00	2,00	0,00	62,96	21,43	7,14	7,14
Cyber Citizenship	100,00	0,00	0,00	0,00	100,00	0,00	0,00	0,00	66,67	33,33	0,00	0,00	33,33	20,00	0,00	50,00
Cyber Crime	50,00	50,00	0,00	0,00	83,33	16,67	0,00	0,00	50,00	50,00	0,00	0,00	57,14	42,86	0,00	0,00
Information & Password Security	90,00	5,00	0,00	5,00	78,18	9,09	0,00	12,73	87,50	12,50	0,00	0,00	63,89	22,22	5,56	8,33
Hardware Security	0,00	100,00	0,00	0,00	50,00	50,00	0,00	0,00	77,78	22,22	0,00	0,00	58,33	25,00	0,00	16,67
Viruses & malware	6,67	20,00	0,00	0,00	75,00	17,86	0,00	0,00	42,86	42,86	0,00	14,29	36,36	45,45	9,09	9,09
Piracy	0,00	0,00	0,00	0,00	0,00	0,00	100,00	0,00	100,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

A - Dominant-hegemonic B - Negotiated C Oppositional D - Null

Figure 5.
Percentage of posters in per AAT position each year (%)

applied to these and other topics, e.g. cyberbullying and stranger danger (including social network aspects) were the most requested customizations for the expert presentations at the school.

5.2.2 "A negotiated code" position. The majority of the posters overall in every category were negotiated to some degree. Frequently, they almost adopted the preferred meaning; however, they had a margin of contextual interpretation from the learner's perspective which prevented the depicted message from perfectly aligning with the campaign's preferred message meanings. The majority of these poster creators could be persuaded to accept the campaigns preferred meaning after further or more in-depth exposure to the campaign.

5.2.3 "An oppositional code". Over the past few years, there have been topics which had oppositional interpretation depicted in posters. The topics per year are as follows: 2012(none); 2013 (stranger danger, browsing and downloading); 2014 (stranger danger, cyberbullying) and 2015 (cyberbullying, information and password security, viruses and malware and piracy). These messages were all strongly covered in the campaigns. The posters which indicated this interpretation seemed to illustrate the situation, but it did not indicate that any of the negative issues within the topic should be prevented or supervised. Several of the posters classified as being oppositional actively encourage the opposite of the campaigns' preferred meaning for the message text. These topics will require communication adjustments to try preventing the oppositional view from being taken.

This section provided the general context and facts about the learner's participation in the campaign's poster competition. Then it conducted analyses to answer the first research design's following questions: "What topic(s) do the message(s) in the poster cover?" in Section 5.1 and "What position within Hall's encoding/decoding theory did

the audience member (poster creator) take once they decoded the campaign's message (in the researcher's opinion)?" in Section 5.2.

A limitation of the analyses is that measurements could only be taken for the a topic's messages which the audience depicted in their posters. Other messages and their meanings may have been relatable for and accepted, negotiated or rejected by the audience; however, within the current research design, they could neither be measured nor analyzed. The next section will outline with the final conclusions of the paper.

6. Conclusion

The use of AAT as a lens of analysis of the audience's interpretations of the campaign messages, in the context of the SACSAA campaign, was very successful. It assisted in identifying whether each annum's campaign and audience had intended or interpreted meanings for a corresponding campaign's messages which were comparatively uniform or deviated.

The majority of the campaign's audiences have been actively producing meaning from the materials' messages. The majority of the audiences have been consistently decoding the meanings of each annum's campaign's messages in the dominant–hegemonic (preferred meaning) position. Additionally, the majority of the remaining audience members have been interpreting the materials' meaning in the negotiated coding position. The majority of the audience members have a positive or acceptable negotiated interpretation of the relevant campaign message's meaning.

These findings were particularly strong for messages which strongly related to the participants' perceived personal/asset security. However, the findings also indicated that the audience preferred to negotiate or reject messages that they did not perceive to have a negative consequence for themselves, e.g. messages relating to piracy.

Overall, this paper concludes that the majority of the campaign messages are being heard and subscribed to by the target audience. Consequently, if a cybersecurity culture is developing amongst this audience, it matches the culture which the campaign material intends to foster. This outcome could be further improved, if future work establishes how to encode materials to encourage audiences to accept the campaign's less preferred messages.

Future research and campaign implementations should conduct an analysis using the encoding/decoding model's concepts as part of a reflective feedback process which could contribute to the improvement or maintenance of the campaign.

References

Barker, C. (2012), "Television, texts and audiences", *Cultural Studies*, Sage, New York, NY, pp. 325-360.

Bryman, A. (2012), *Social Research Methods*, Oxford University Press, New York, NY.

De Lange, M. and Von Solms, R. (2012), "An e-Safety Educational Framework in South Africa", in *Proceedings of the Southern Africa Telecoms and Network Applications Conference*, Goerge, South Africa, available at: www.satnac.org.za/proceedings/2012/papers/3.Internet_Services_End_User_Applications/53.pdf

Furnell, S., Bryant, P. and Phippen, A. (2007), "Assessing the security perceptions of personal internet users", *Computers & Security*, Vol. 26 No. 5, pp. 410-417.

Hall, S. (1980), "Encoding/decoding", *Culture, Media, Language: Working Papers in Cultural Studies*, Centre for Contemporary Cultural Studies, London, Hutchinson, pp. 128-137.

Hodder, I. (1994), *The Interpretation of Documents and Material Culture*, Sage, Thousand Oaks.

IWS (2015), "South Africa Internet usage, broadband and telecommunications reports", Internet World Stats Usage and Popoulation Statistics, available at: www.internetworldstats.com/af/za.htm (accessed 10 January 2016).

Klimburg, A. (Ed.) (2012), *National Cyber Security Framework Manual*, NATO CCD COE Publicaions, Tallinn.

Krippendorff, K. (2004), *Content Analysis: An Introduction to its Methodology*, Sage, New York, NY.

Munday, D. and Chandler, R. (2011), *A Dictionary of Media and Communication*, 1st ed., Oxford University Press, Oxford.

Reid, R. and Van Niekerk, J. (2013), "Back to basics: information security education for the youth via gameplay", in *8th IFIP WG 11.8 World Conference on Information Security Education*, Springer, Auckland, pp. 1-10.

Reid, R. and van Niekerk, J. (2014), "Brain-compatible, web-based information security education: a statistical study", *Information Management & Computer Security*, Vol. 22 No. 4, pp. 371-381.

Reid, R. and Van Niekerk, J. (2014a), "Snakes and ladders for digital natives: information security education for the youth", in Veniamin M., Ginodman, M.S. and Natalya O. (Eds.) *Information Management & Computer Security*, Vol. 22 No. 2, pp. 179-190.

Reid, R. and Van Niekerk, J. (2014b), "Towards an education campaign for fostering a societal, cyber security culture", in *8th international symposium on human aspects of information security & assurance*, Centre for Security, Communications & Network Research Plymouth University, Plymouth, UK, pp. 174-184.

SACSAA (2011), "South African Cyber Security Academic Alliance (SACSAA)", cyberaware.org.za, available at: www.cyberaware.org.za/

Siponen, M. (2001), "Five dimensions of information security awareness", *ACM SIGCAS Computers and Society*, Vol. 31 No. 2, pp. 24-29.

Van Niekerk, J., Thomson, K.-L. and Reid, R. (2013), "Cyber safety for school children: a case study in the Nelson Mandela Metropolis", in *8th IFIP WG 11.8 World Conference on Information Security Education*, Springer, Auckland, pp. 103-112.

Von Solms, S. and Von Solms, R. (2014), "Toward cyber safety education in primary schools in Africa", *8th International Symposium on Human Aspects of Information Security & Assurance*, pp. 185-197.

Corresponding author
Rayne Reid can be contacted at: s208045820@nmmu.ac.za