

A Cyber Security Culture Fostering Campaign through the Lens of Active Audience Theory

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Abstract

The South African Cyber Security Academic Alliance's (SACSAA) cyber security educational campaign aims to foster a cyber -safe and -secure culture amongst South Africa's youth. Previous work shows that the campaign is fostering a cyber security culture amongst its audience. However, it has not determined if the *developing* culture aligns with the *desired* cyber security culture that the campaign *expected* to foster. The target audience's interpretation of the campaign's educational messages meanings can affect a developing cyber security culture; possibly resulting in it not aligning with the campaigns preferred culture. This paper examines the audience's interpretative role in developing a cyber security culture, through the lens of active audience theory. The objective is to enable early detection of deviations between the campaigns objectives and its actual results within the audience.

Keywords

Cyber security culture, cyber security education, Active Audience Theory, Action Research, Case study, SACSAA, Public understanding of security

1. Introduction

In our technology- and information-infused world cyberspace is an integral part of 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 & Von Solms 2012). Several countries governments have recognized the many potential benefits that the adoption of the Internet and 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. The resultant rapid adoption of cyber technologies and services has had some very positive results e.g. providing users access to many beneficial and convenient services and utilities. However, it has also had some negative and often *unintended* consequences. A prominent, problematic consequence is that the citizens are becoming increasingly technology dependent whilst also becoming increasingly vulnerable to cyber threats (Furnell et al. 2007).

As the number of *active* cyberspace users increases, so too does the chances of a cyber threat finding a vulnerable target also increase. Most users are not significantly aware of or secured against the cyber threats targeting them. To avoid becoming victims of cyber threats these cyber citizens 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 and need to be educated about cyber security. However, this education is particularly important for children who interact with cyberspace from an early age (De Lange & Von Solms 2012). A cyber security culture if instilled amongst the youth may become an integral part of all their daily activities throughout their increasingly technology infused lifetime. Additionally these children may further foster the culture by passing it on to their own children in the future. Therefore, it is particularly important that campaigns which target the youth are effective at communicating the right cyber security themed messages. The campaigns should present the messages in a way that enables the children to understand the message as the campaign's content intends it to be understood.

In South Africa, the South African Cyber Security Academic Alliance (SACSAA) runs an annual campaign which aims to raise school children's awareness about vital cyber security and safety behaviours. Ideally the campaign aims to aid in the fostering of cyber security culture amongst cyber citizens. This paper asks: "Is the developing cyber security culture, the culture which we intended to foster?"

This paper aims to use active audience theory as a lens to determine whether the SACSAA Cyber Security Campaign's target audience has been unambiguously and uncritically interpreting the meaning off the educational campaign's awareness themes (messages) as they were intended to be imposed by the campaign creators. Detecting if the audiences interpretation deviates from the campaign's intended result may make it easier to identify necessary adjustments for future campaigns.

The remainder of this paper is structured as follows: Section 2 provides more detail about the SACSAA Campaigns. Section 3 provides a preliminary explanation of the active audience theory paradigm. The research design used to meet this papers aim is outlined in Section 4. Section 5 presents the findings of the paper. Finally our work is concluded in Section 6 and limitations of the research are presented in Section 7.

2. The SAACSA Campaign

The South African Cyber Security Academic Alliance (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 cyber security 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 cyber security 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 cyber security in their digital activities. There are six main thematic messages in the campaign: "Keep your private information private"; "Be nice online"; "Stay legal"; "Trust an adult"; "Protect your PC", "Stranger Danger". A wide variety of cyber

security and safety topics within these themes have been covered each year. Mass media is used to distribute messages and cultural forms (information) to large, widely dispersed, heterogeneous audiences (Munday & Chandler 2011). The campaign presents each topics 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 & Van Niekerk 2013)) and finally public events (interactive school visits).

Each year the campaign has been modified to increase effectiveness of the successive campaign's results and scalability. Changes and additions to the campaign have included the use of pedagogical theory, use of multimedia and interactive presentations and multimodality in the campaign material, increased contextual customization, increased teacher involvement, inclusion of SACSAA's branding logos and mascots. Detailed about the modifications and results from 2011 until 2013 are available in previous work (Van Niekerk et al. 2013; Reid & Van Niekerk 2014). In 2014 the campaign was adapted to be more teacher-oriented, and a cyber security school curriculum was provided.

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 an awareness message (as they understand it) for one or more of the campaign's topics. Participation is voluntarily. Evaluations of past campaign iterations competition posters has shown that the majority of participants have internalized (learned from) campaign messages. Posters indicated internalization was: "partial" if the learner depicting 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. It is possible that the raised awareness levels (shown by internalization), and any resultant behaviour modifications could enable the fostering of a culture amongst these participants.

This research aims to determine if the cyber security culture being fostered by the SACSAA campaign aligns with how the culture messages were intended to be being interpreted. The role of the audience in this process has yet to be examined. It is the author's opinion that active audience theory could be used to understand the role of the campaign's target audience's in fostering a cyber security culture. This opinion is due to the campaign's use of mass media and its purpose of communicating with and having a message understood by an audience (television has the same purpose).

3. Active Audience theory paradigm

In cultural studies dealing with television and mass media, understanding the relationship between a media "text" and it's audience (audience research) (Barker, 2012). In this field, the role of the audience is therefore a research focus. This paper examines the active audience paradigm. Active audience theory examines the active, interpretative role of audience when they "make meaning" from the media content (Hall, 1980; Munday & Chandler, 2011). This paradigm suggests that it should not

be assumed that audiences develop a culture by uncritically accepting the ‘textual’ meaning of a programme (Barker, 2012).

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, which 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 the meaning of the message similarly. This is because the meaning of a message is polysemic and an audience is seldomly passive.

The active audience theory paradigm argues media has a preferred message to communicate to their audience, but media audiences do not passively accept information and its imposed meanings from a structured text (Munday & Chandler, 2011). Stuart Hall’s encoding/decoding model (see Figure 1) illustrates this by showing the discourses of the meaning of the text between its producer (encoder) and the reader (decoder) (Hall, 1980).

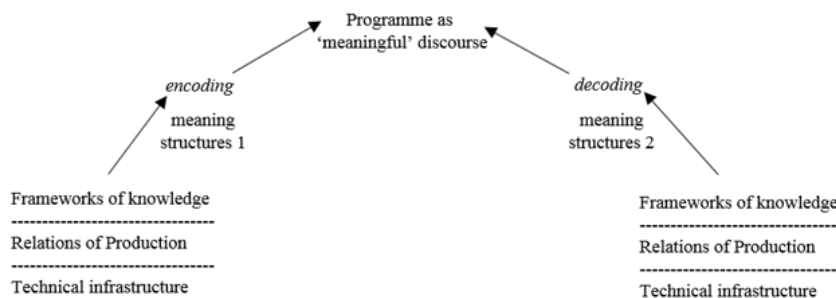


Figure 1: Meaningful Discourse (Hall, 1980)

Within the circuit of communication the encoding/decoding model shows that audiences are active and knowledgeable producers of the meaning a texts delivered message within their personal and social contexts (Barker, 2012). The producer (encoder) encodes meaning in a certain way, while 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 texts meaning is “the product of a negotiation between the audience and the text in a particular context of reception” (Munday & Chandler, 2011).

In brief, different audiences may accept different textual meanings, based on how the “text” is constructed and communicated. *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 audiences decoding will typically fall into one of the following three hypothetical decoding positions as proposed by Hall:

- “The dominant-hegemonic encoding/decoding” where the decoder accepts the messages ‘preferred meanings’ which a text is attempting to impose (Hall, 1980);
- “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);
- “An oppositional code where audience members understand the preferred encoding may reject it and decode the text in contrary ways” (Hall, 1980).

All positions are the result of the whole communication process and the decoders (audience) producing their own meaning of the message. For the purposes of this paper, a fourth decoding position could be “null” wherein where the audience members did not understand/accept/ process the message clearly.

Due to the campaigns use of mass media, the authors believe it is possible to apply the encoding/decoding model to the campaign’s audience. The decoding position espoused by the majority of the SACSAA audience’s takes could indicate what type of culture is developing. This could then allow measurement of whether the fostered culture aligns with SACSAA’s intended culture formation.

4. Research design

This research examines a case study of the annual SACSAA educational campaign. This campaign has been running since 2011. Its target audience is the all South African youth. However, thus far data has only been gathered from the numerous schools in the Nelson Mandela Metropolitan area who have been increasingly exposed to the campaign. This paper aims to determine if a culture which has developed over time amongst an audience, matches the campaign’s desired culture. 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, in order 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 to have participated in every campaign since 2012 until 2014 (last complete campaign) will be used. This school will be referred to as ‘School A’.

‘School A’ is a convenient and purposive sample for the analysis purpose of this paper. Firstly, it is a convenience sample as the data was "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. Secondly, 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. The students within ‘School A’ have been exposed to all of the involved culture fostering and measurement activities. The sample is believed to be representative of the SACSAA campaign’s overall target audience because: the participants are all primary school children; their age ranges between 6 and 15; members of both

genders participated; and different ethnic groups were represented. Due to ethical considerations no identifying data apart from participant age was captured.

A content analysis; as described by Krippendorff (2004); was done to determine if the audiences 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 artifacts (Hodder, 1994). The researchers consider the SACSAA competition posters to be iconic cultural artifacts, 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 and internalization of the educational message matched, closely related (generally agreed with minor differences in interpretation) or opposed the campaign's intended meanings. For this analysis the following questions were asked for each poster: Firstly, "*What topic(s) do the message(s) in the poster cover?*" and secondly, "*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 more important by the learners. The campaign covered all of its topics well, however, it placed emphasis (considerable content) on the issues it considered critical issues. These thematic issues messages are: promoting anti-cyber-bullying, personal pc and information protection, and staying legal online. The percentage of posters covering a topic will be compared to the ratio of the campaign's content which covered the topic. The difference between the percentages could indicate a match or difference rating covered issues importance from the audience's and campaign's perspective.

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 the show it 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 meaning according to Stuart Hall are explained in Section 3. In order to determine which of these positions a poster belonged to, the following questions were asked as an evaluation matrix:

- Does the posters *textual message* support the related campaign topic(s) message?
- Does the posters *graphical message* (examples/warnings) support the related campaign topic(s) message?

- What overall impression (in the researcher's opinion) does the poster give of the participant's interpretation of the related campaign 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; 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 question was answered as 'undeterminable' in which case the posters was 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 by Figure 2.



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

An example of a poster which is categorised as accepting the dominant-hegemonic (preferred) encoding/decoding of the campaign's message for the topic of cyberbullying is shown in figure 2a. The text strongly supports prevention and stopping of cyber bullying and provide tips on how to do this. The graphics strongly support the message e.g. it shows the consequences (emotional pain) of the cyber bullying on the victim and the platforms this bullying may occur on. Overall the posters strongly suggests that the participant agrees with the campaigns objective of promoting the prevention of being a cyber-bully and/or victim of cyber bullying. In contrast to figure 2a, figure 2b shows an example of a poster which is categorised as representing an oppositional coded interpretative position for cyber bullying topic. The textual message was classified as being oppositional as it did not discourage cyber bullying in anyway, instead it seemed to say cyberbullying is inevitable and consequences should be disregarded. The graphical pictures illustrated an example of cyber bullying but did not indicate it should be stopped or that it was bad,

therefore they were also classified as being oppositional. Overall the poster seemed to promote cyber-bullying rather discourage it.

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

5. Analysis and results

This analysis aims to determine if the culture being fostered amongst this audience matches the campaign expected resultant culture. Historically, School A has had 240 learners voluntarily participate in the poster completion (50 learners in 2012, 102 learners in 2013, 90 learners in 2014). Some posters represented multiple themes and topics. The distribution of the posters per campaign topic is shown in figure 3.

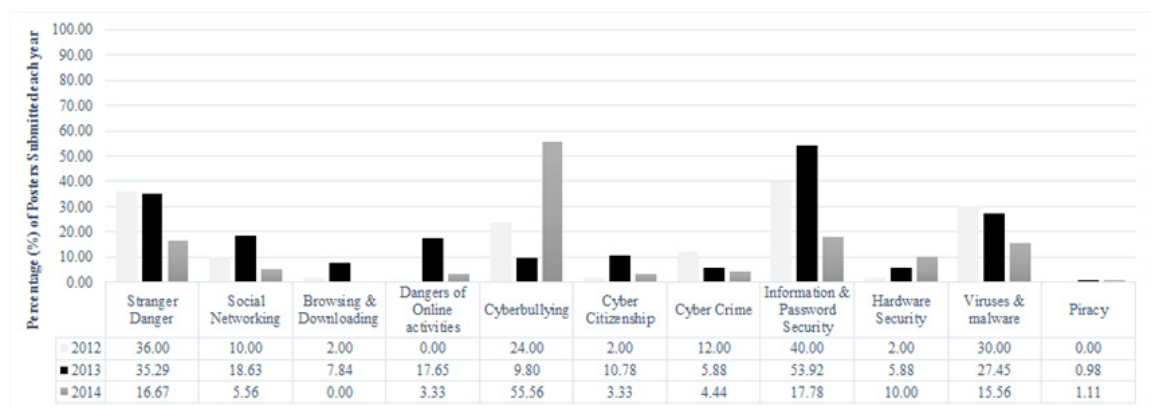


Figure 3: Percentage of each year's posters showing a particular topic

Based on Figure 3, the audience has shown a high rate of acceptance of messages relating to the dangers of interacting with strangers online, keeping their personal information (and passwords) private and secure and prevention of cyber bullying. Contrastingly they do not accept the message of anti-piracy. These four messages were equally focussed on as serious issues in all of the campaign material, as they are issues which are strongly associated to children's cyber activities. The audience seems to agree with the campaign about the importance personal and asset security and safety; however, they reject the campaign's view that piracy and infringement of others individuals/entities property rights should be stopped (particularly if they benefit from the infringement). An informal tally done by School A's teachers found that the majority of the learners had pirated one or more series, film and/or game.

Further analysis evaluated the position of the audiences decoding an interpretation of the campaign topics messages as previously discussed. Figure 4 shows that the majority of learners accepted the campaign's preferred (dominant-hegemonic) interpretation of message for their chosen topic. Additionally the remainder of the posters positions were categorized as having accepted a negotiated coding position. It is very rare for the posters to be categorized as opposing the message or being undeterminable. This trend is visible in three successive years' posters.

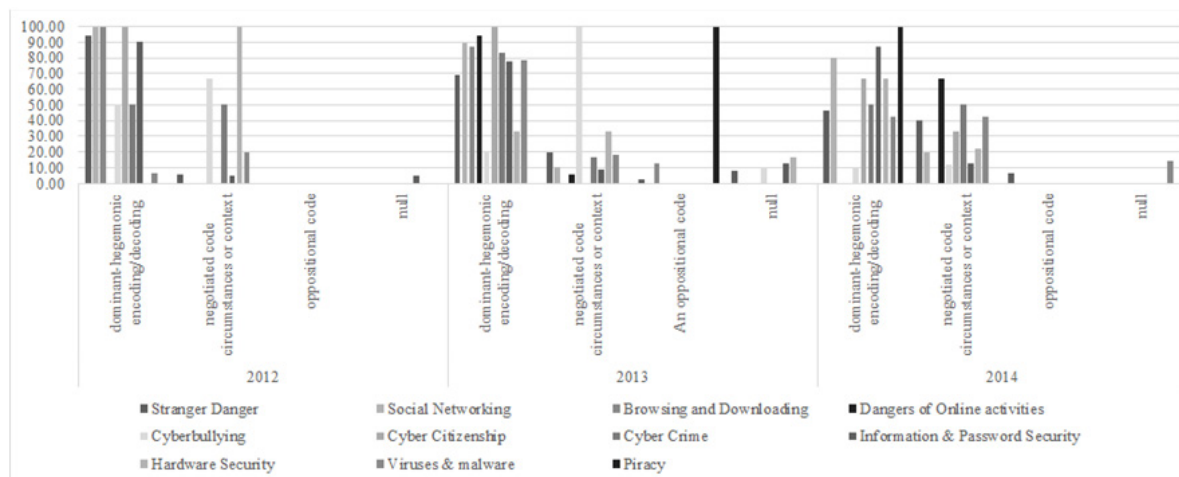


Figure 4: Message Decoding Position (%) per annum's poster ratio in topic area

Generally, this analysis has determined firstly, that the audience places similar ratings of importance on particular topic messages with the campaign; secondly, the majority of the audience is accepting/partially accepting the campaign's message meaning as the campaign prefers them to be understood. Therefore, this analysis concludes, that the culture being by the campaign amongst this audience closely aligns with the campaign's desired culture.

6. Conclusion

The campaign's audience has been actively producing meaning from the materials messages. The majority of the audience is decoding the campaign's messages and accepting the campaign's preferred message meanings. 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 cyber security culture developing amongst this audience matches the culture which the campaign material aims to foster. This outcome could improve further, if future work establishes how to encode material to encourage audiences to accept the campaign's less preferred messages.

7. Limitations of this research

Firstly, all conclusions drawn from the qualitative analysis of the posters may be in some measure biased by the researcher's interpretation of each poster. Secondly, the overall campaign message rejection or negotiation may not be completely measured from the data as learners were only required to include a minimum of one campaign message in their artefact as they understood it.

8. Acknowledgements

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