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Sustainability Education Using ICT-Supported Dialogue - Towards Transforming Adolescents' Perceptions of Alcohol in the Punjab, India

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Abstract

A potential health crisis looms large in the Punjab, India where alcohol consumption has risen dramatically. Adolescents are especially vulnerable to the toxic effects of alcohol. This empirical study presents a pedagogical intervention, Children as Agents of Social Change (CASC), which aimed to raise awareness about the effects of alcohol using an ICT-supported educational dialogue among adolescent students and alcohol-experts from multiple domains. Primary data consists of pre- and post-test questionnaires from the control and experimental groups (N=379) and an interview of the teacher-in-charge of one experimental school. Results indicate that the intervention significantly improved students' scientific knowledge about alcohol; changed their attitudes towards media and celebrity promotion of alcohol; and enabled to surmount the odds to spread information – acquired during the CASC intervention- to people outside the school, including adult drinkers. Learner-centric pedagogy combined with ICT clearly amplified transformative learning. CASC appears to be a promising approach in Education for Sustainable Development (ESD). It can be used for multiple sustainability issues.

Keywords: CASC, ICT-supported dialogue, transformative health education in developing countries, alcohol education, sustainability education.

Introduction

Health is an important aspect of social sustainability. Non-Communicable Diseases (NCDs) or lifestyle diseases are the biggest threat to human health. Alcohol consumption, tobacco, unhealthy diet and lack of exercise are the four leading causes of NCDs (WHO, 2011). Alcohol consumption is strongly linked with cancer, cardiovascular disease, liver disease, pancreatitis and diabetes (Parry et al., 2012). In 2008, about two-thirds of global deaths were caused by NCDs. Developing countries bear nearly 80% of the global

NCD burden (WHO, 2011). NCDs cause 61% of deaths in India (CSE, 2017). Drinking among adolescents is especially problematic as it can negatively impact an adolescent's developing brain (Walsh & Bennet, 2005; Giedd, 2008). With regards to sustainability, education must aim to foster informed, empowered and involved young citizens (Ohlmeier, 2013).

Nearly 90% of global adolescents live in developing countries (Sawyer et al., 2012). Despite urgency, most developing countries struggle to provide even good-quality basic education. Most developing countries lack the required number of teachers and these teachers are often ill-prepared to teach (Tooley, 2009). Therefore, innovative responses are urgently required to adequately meet these serious educational challenges (Sterling, 2011; Iliško & Badjanova, 2014; Salīte, 2009; Salīte et al., 2016).

This study created an intervention based on aready-to-use framework – the Children as Agents of Social Change (CASC) framework. This CASC framework provides guidelines to create pedagogical interventions that enable transformative learning (Roy et al., 2013, 2014). This study investigates the applicability of CASC in an educational intervention conducted among middle and high school students in the Punjab, India, to prevent a potential NCDs crisis caused by alcohol. Middle school in India includes classes 6 to 8 (ages 11–14 years); and students in classes 9 and 10 (ages 15–17 years) are high school students.

Problem Background

In the Punjab, alcohol consumption rose by 60% during 2006–2011 (PTI, 2012). In recent years, drug use in the Punjab has also risen alarmingly (Ghosh, 2013; PTI, 2014; TNN, 2015). Sandhu's study (2006) explored the nature and pattern of addictions in the Punjab and found 73.5% of addicts were in 16–35 years of age. Alcohol users are more likely to use harder drugs (Botvin & Griffin, 2004). A state-sponsored study on substance-use estimated the presence of 2.2 million alcohol-dependents, 1.6 million tobacco-dependents, and 0.27 million drug-addicts in the Punjab (Khanna, 2018).

Changed drinking patterns indicate that Punjabis have started to perceive alcohol differently in recent years. The real crisis of alcohol does not begin when a person becomes addicted to alcohol, falls sick or dies of alcohol. The crisis of alcohol in the Punjab needs to be understood in terms of (Punjabi) people's willingness to presume thoughts that construct positive attitudes towards alcohol and alcohol consumption. Such thought-patterns lead people to perceive alcohol-consumption as normal and an acceptable part of life. Accepting these thought-patterns underlie the external symptoms of addiction, disease, disability and death caused by alcohol. Authentic educational interventions must tackle the foundationally misinformed thought-patterns.

India hosts the world's largest teenage population (115.3 million) and about 90% of urban teens consume mass-media (Jain et al., 2011). An ever-younger age of alcohol initiation is the main emerging trend throughout India (Prasad, 2009). Adolescents witnessing widespread alcohol consumption in one's community can lower the threshold for alcohol consumption (Bendtsen et al., 2013).

Along with factual information, ICT-based new media and mass-media often offload misinformation, using sophisticated and psychologically manipulative methods. Punjabi adolescents constantly experience pro-alcohol social reality and dazzling alcohol promotions through advertisements, songs and movies.

Using celebrities in advertising is a marketing strategy that aims to exploit their social status and their fame in promoting a product or a service (Jimémez-Zarco et al., 2016). India ranks highly in the global index of celebrity-influence (power-distance index) indicating that people are uncritically trusting celebrities (Hofstede, 2001). Therefore, pro-alcohol messages passed by celebrities significantly influence Indian consumers' behaviors (Roy et al., 2013). Social background matters: Sandhu's (2006) study also found that 70% of Punjabi addicts were financially marginalized; one possible explanation is that people from disadvantaged social strata are more likely to consume alcohol to numb their frustrations (WHO, 2003).

Share (2009) contends that modern media is a powerful tool of public pedagogy that organizes, shapes and disseminates information, ideas and values to push corporate produced youth culture; and that global media amplifies commercially-motivated information over unbiased and true information. ICTs insidiously affect the social beliefs; they indoctrinate masses for profits (Saffer & Dave, 2006). Strasburger (2011) listed several studies indicating advertisements' power to shape adolescents' minds with positive attitudes towards alcohol.

The latent triggers from social exposure and media constantly prompt youngsters to initiate. In the Punjab, poor quality of health education leaves youngsters vulnerable (Sandhu, 2015). The Khosla et al. (2008) empirical study in the Punjab demonstrated that half of college-going, school-pass-out adolescents had already used alcohol.

Transformative Learning, Dialogue and ICTs in Education

Transformative learning (TL) is an effective approach to shift perspective and effect behavior change. TL challenges learner's existing assumptions; induces far-reaching shifts in a learner's perspective; produces significant impact or even paradigm shifts; changes the learner's personality; and affects learner's subsequent experiences (Clark, 1993). Through TL, the learners adopt more inclusive perspectives and world-views (Mezirow,1991; Fedosejeva, et al., 2018).

Sterling (2011) has conceptualized the 'three orders of learning' to clarify pedagogical qualities of TL. In 'first order learning', education is provided within accepted boundaries and learner's basic values about the topic are left unexamined and unchanged. 'Second order learning' promotes critically reflective learning among students. It makes them aware of how they think about the issue. 'Third order learning' involves transformational, creative, epistemic learning and paradigm change. It encourages learners to see things differently, and hence changes their perceptions.

Dialogue is a transformative learning practice of collective communication that convenes learning through participatory, authentic and egalitarian social discourse. Dialogue represents 'the microcosm' of the society, i.e. it represents various opinions and assumptions (or thoughts) of different sub-cultures prevailing within a culture (Bohm, 1996; Cayer, 2005).

Dialogue is largely about sharing information and constructing shared vision (Knutsen & Le Bigot, 2012; Pipere et al., 2015). ICT has revolutionized how humans share information and it has also attained a major role in education as well. Many low-cost, high-tech solutions like Hole-in-the-wall and One-Laptop-Per-Child have enthusiastically presented themselves as solutions to overcome the third-world educational deficit; however rigorous research strongly disagrees with their claims (Arora, 2010; Behar, 2010).

Apparently, education and learning are understood differently by technologists and educationalists. Seen from the pedagogical point of view, the main purpose of ICT is not to boost learning but to enable and intensify dialogue and communication.

CASC for Transformative Education

Millions of Punjabi adolescents are living in at-risk circumstances. Dialogic education can help these youngsters understand the effects of alcohol better and choose healthy trajectories. Creating a real-life dialogue for school students raises challenges like gathering alcohol-related experts, getting them to visit the schools and their ability to use students' native language. Also, schools' daily routines and material resources set their own limitations.

The first writer (AR) has developed an ICT-supported pedagogical framework 'Children as agents of social change' (CASC). The pilot version of CASC was put in practice in Tanzania, where its aim was to increase the understanding of local students and residents about ecological and social defects that were caused by forest fires (Roy et al., 2014). In Tanzania, the CASC framework combined educational videos with problem-based learning (PBL). The principal idea was to promote sustainability by developing a learner-centric, culturally-sensitive, locally-contextualized and cost-effective learning environment. Features like adaptation of the content to the local circumstances, use of native experts, and pragmatism about non-availability of ICT infrastructure underlie CASC.

Despite these learner-centric features, CASC framework-based intervention in Tanzania handled education mechanically to disseminate knowledge. Accordingly, the CASC framework suffered four critical educational limitations:

1. Adolescents often have prior knowledge about recurring societal phenomenon from informal and non-formal sources. Correcting misinformation and misconceptions thus learned need deeper reasoning and accurate knowledge (Ambrose, 2010). CASC did not consider prior knowledge at all.
2. Critical reflection is enriched by viewpoints of multiple stakeholders and multidisciplinary experts. However, CASC intervention highlighted the views of the forestry-experts only. The approach could lead to partial understanding of the problem.
3. CASC framework-based intervention used educational videos to provide working-level experts' knowledge to the school-students. However, students had no opportunity to question the experts. Such top-driven, hierarchical information flow is quite possibly indoctrinating. Indoctrination impedes deeper learning (Krishnamurti, 1953) and co-investigation of reality (Freire, 1970).
4. The CASC framework screened the educational video through a projector setup only once. Low device availability is not uncommon in developing countries. Even if required, students had no option to review the imparted knowledge.

Some foundational changes were made to overcome these shortcomings. The following respective steps could convene this shift:

1. Survey of popular thoughts/beliefs prevailing in the society, especially among its youth, could clarify the common instigators that students might encounter and embrace.

2. The students should have the ability to question the experts through inexpensive ICTs.
3. Multi-disciplinary experts and the views of various stakeholders could be integrated into the educational content.
4. Illustrated summary-booklets could serve as review-source.

Modified CASC incorporating these amendments was used to guide the intervention in Punjab. Figure 1 briefly depicts the information flow in the CASC based intervention:
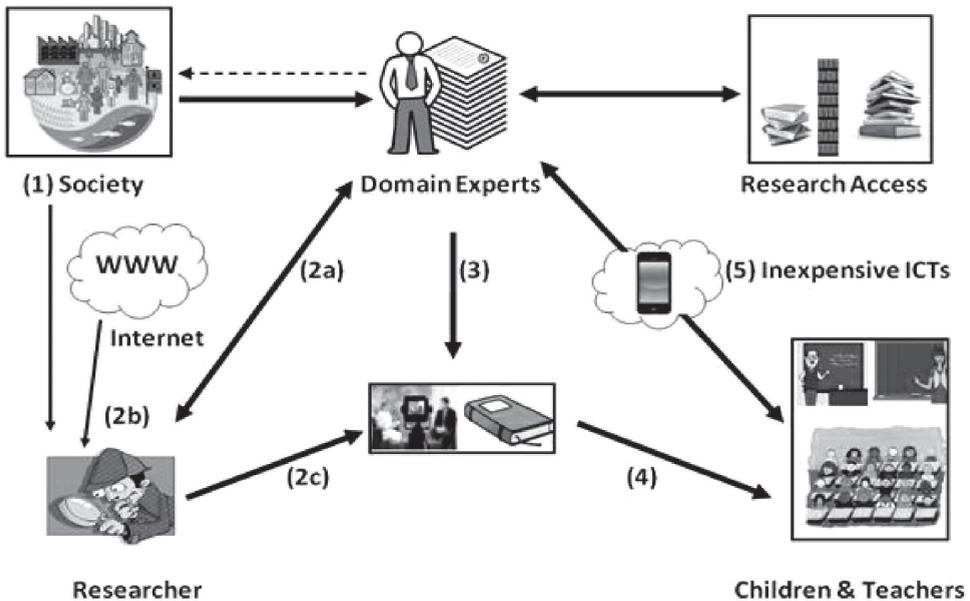

Figure 1. Information-flow in *CASC* framework:
  1) *Informal survey of thought-patterns that encouraged alcohol-use among drinkers;*
       2a) *Interviews with multi-disciplinary, working-level experts discussing popular notions about alcohol;*
       2b) *Accumulating resources from the Internet;*
       2c) *Creation of learner-centric video and illustrated summary booklets;*
  3) *Experts validate the content;*
  4) *Show video and provide booklets and*
  5) *Inexpensive ICT-based communication between experts and schools.*

Implementing CASC Intervention in the Punjab

The guiding principle in modified CASC is to use dialogue to facilitate transformational learning. The localization of content helps youngsters find real life connections easily. Connecting the content with real life can ground the educational dialogue in day-to-day reality. In the Punjab intervention, popular beliefs or thought-patterns about alcohol and its usage were mapped through an informal survey among adult and adolescent Punjabis. These beliefs were analyzed and categorized in three categories:

- prevailing social norms and increasing acceptance of alcohol;
- media influences;
- and lack of scientific knowledge.

Video-recorded interviews were held with noted experts from multiple alcohol-related domains. These interviews clarified the foundational beliefs among Punjabis about alcohol. Based on the collected material, an educational video of 40 minutes was made. Wherever needed, the expert's voice was translated and dubbed into Punjabi by the volunteers – the local theater artists.

The openness of communication is a necessary part of any dialogic relationship. In the Punjabi case, students were offered an opportunity to ask questions to the experts and even challenge their expertise. This was made possible by inexpensive ICTs that were used to enable communication between students and the experts. Low device availability is not uncommon in developing countries. Because most students did not have access to the video content after the intervention, an illustrated summary-booklet was made to serve later as a review-source. The educational content (i.e. the video and the summary-booklet) re-created the microcosm of the Punjabi society about alcohol (see Table 1) by depicting the popular thought-patterns that pave the way for drinking initiation. The experts validated the final content.

Table 1
Constructing the Microcosm of Punjabi Culture Regarding Alcohol

Thoughts of/by/about	Represented by	Content Type (Source)
Peer influences	Edutainment video depicting role of peer influences and media in alcohol initiation	Video (from the director)
Alcohol drinkers	Posed as questions to the experts	Informal discussions with drinkers
Alcohol producers	Psychiatrist: market research by alcohol producers	Video (Interview)
Media and celebrities	Celebrities promoting alcohol through surrogate advertisements	Videos and images (Internet)
Local reality (learner's life-world)	Local liquor shops and billboards promoting alcohol placed at city's prime locations	Images (researcher clicked images)
Local cultural trends	Punjabi parties with alcohol	Party images (Internet)
Medical researchers	Psychiatrist (Professor)	Video (Interview)
Physiological consequences	Images and animation	Videos and images (Internet)
Neurological effects of alcohol	Brain scans and brain development phases	Images (Internet)
Addict's family	Girl with alcohol addicted father	Video (Interview)
An educationalist	Physician-turned-teacher's views about alcohol among youth and cultural trends of alcohol acceptance	Video (Interview)

Sequel to Table 1 see on the next page.

News reports	Data about high alcohol consumption in Punjab and Patiala; quantity of alcohol consumed	An anonymous blogger's collection of alcohol-related news-reports (Internet)
Social costs	Drunk driving accidents from Punjab	Video and images (Internet)
Social consequences	Brief mention of Widow's town (Maqboolpura in Amritsar, Punjab); an area affected by high alcohol and drug related deaths	Video (Interview), video (from the social worker in Maqboolpura) and images (Internet)
Social workers	Two social workers from Widow's town explained social disfunctions caused in their area by alcohol and drugs	Video (Interview)
Sociology research	Sociologist (Professor) with research expertise in drug research in Punjab	Video (Interview)

The Internet was used as an easy-to-locate and ready-to-use repository where individuals and organizations had already amassed helpful resources about alcohol. Emails were sent to the original content-publishers requesting content re-use permissions, but only one content-publisher (who vindicated the effort) responded. Following legal advice, a 'Disclaimer' about non-commercial, educational use of the content was added in the materials and a list of sources were included in the video.

Methodology

This study investigates, in a developing country context, the feasibility of the CASC framework in an ESD intervention aiming to transfer students' perceptions about alcohol. The aim of this study can be divided into three research questions:

Does CASC intervention enhance students' knowledge about alcohol and its usage?

Does CASC support critical evaluation of Media contents and advertisements?

Does CASC approach promote transformative learning in ESD?

As the main target of this study is to solve a difficult issue in society, i.e. alcohol abuse, by broadening adolescents' perceptions about alcohol and thereby possibly their forms of conduct, there seems to be close resemblance to educational action research (see Salīte, 2008; El-Deghaidy, 2012). It is seen as an effective tool to foster reflection and visioning in education. Varieties of educational action research e.g. participatory action research, experimental action research and transformative action research- guided the approach of this intervention at different stages.

Sample for the Research

All participating schools were from urban areas of Patiala district in the Punjab. School B volunteered to take part in the CASC intervention. The District's Education Office (DEO) strongly suggested this intervention for School A as students in this school came from financially marginalized backgrounds where alcohol consumption was high. The three control schools (C, D and E) did not want to participate beyond pre- and

post-tests. In total, five schools agreed to participate. All participating schools mentioned that they keep informing their students about alcohol and drugs in various ways along with teaching the related educational materials.

Average age of control group was 13.3 years and of intervention group 13.9 years. Table 2 presents sample details and ICT readiness of the schools. Informed consent forms were signed by parents of all participants.

Table 2
Sample Size and ICT Availability in Schools

Group	School	ICT Infrastructure	Number(F + M)	Group-Total
Intervention	School A	None	33 (7 + 26)	167 (70 + 97)
	School B	None	134 (63 + 71)	
Control	School C	None	100 (45 + 55)	212 (93 + 119)
	School D	Available	70 (40 + 30)	
	School E	Available	42 (22 + 20)	
Total			379 (163 + 216)	379 (163 + 216)

The Intervention Process

The researcher brought the required ICT equipment (projector, laptop, speakers and summary-booklet) as the experimental schools lacked them. During intervention, the experimental group watched the educational video: Is alcohol really harmful? 'and video about problem-based learning (PBL) approach. After the video, the teachers created student groups; they asked students: "If alcohol is a problem in your society; then what are you, as a group, going to do to solve this problem?" In response, students were asked to decide on a group-project through group-dialogues. Each group received a summary-booklet. Students were encouraged to ask questions of the teachers and the experts before and during the carrying out of group activities. Questions unanswerable by the teachers or researcher were forwarded to an appropriate expert through ICTs. The expert's responses were publicly shared. Each group presented its final work to all the participants.

Pre-testing preceded the intervention. The researcher explained how to answer the questionnaire and the use of collected data in this research. School A asked the researcher to be the teacher and to conduct the intervention in two and half days. School B made its own teacher in-charge of the intervention and invested one-period a day for two weeks. The CASC intervention was implemented as described above. Post-Testing was conducted after the group-presentations. School B's Teacher in-charge was interviewed after the post-test.

Emails were sent to the school board to clarify ambiguities. The entire intervention was focused on the effects of alcohol. Throughout the intervention, students were never told to consume or not consume alcohol.

Data Sources and Data Analysis

Pre- and post-testing used the same questionnaire that was in the Punjabi language. Students who skipped either of the tests were excluded from the analysis. The items of the questionnaire mapped students' responses on the following:
   (1) perceptions about alcohol usage in their local environment,
   (2) scientific knowledge about alcohol usage,
   (3) attitudes towards media and celebrities,
   (4) beliefs and attitudes about drinking, and
   (5) perceptions about children's role in a society.

The questionnaire included Likert-scale, multiple choice, small-answer and open-ended questions. Additional post-test questions were asked of the experimental group only.

Statistical tests were used to estimate the significance of any observed differences. The Welch t-test was applied when comparing the responses of intervention groups and control groups (Delacre et al., 2017). When the differences between all participant schools from A to E were examined, Welch's ANOVA was used as the statistical tests and Games-Howell as a post-hoc test (Field, 2013, 442–459). In the Welch's t-test and Welch's ANOVA, the homogeneity of variances is not assumed. When schools are compared in the text, for the sake of clarity a sub-index is added to the mean in order to help identification (e.g. M_A = the mean of school A).

When the differences between pre- and post-test responses in a single group were examined, the paired sample t-test was applied because it tolerates skewness and non-normality in the distribution (Delacre et al., 2017).

Students' responses to the open-ended questions as well as the interview of the teacher-in-charge in school B were analyzed using conventional content analysis (Hsieh & Shannon, 2005).

Results

Perceptions About Alcohol Usage

According to the pre-test, a majority of students both in the intervention group (97%) and control group (92%) were aware that drinking is a common occurrence in the Punjab. Students also knew that people used to drink alcohol in parties and at home (91% intervention, 84% control).

Most of students knew at least one daily drinker, although the relative proportion was significantly higher (p = .002) within the intervention group (89.4%) than in the control group (64.6%). In the school examination, students from school A were more accustomed to see alcohol usage in their daily life (M_A = 1.5) than others; at the other extreme, students of school D (M_D = 2) and E (M_E = 2.7) were least experienced in seeing alcohol usage and its results ($F_{4, 137.8}$ = 11.96, p < .000).

In the pre-test responses, most students were not willing to try alcohol (intervention 85.5%, control 87.1%). In the intervention, the group situation remained almost the same (post-test 86.2%), but in the control group the proportion of those who did not want to try alcohol reduced significantly (76.2%, p = .002). In the school examination, there were also differences between the pre- and post-test responses (Table 3). However, changes in school C and E (control group) are the only ones which are statistically significant (p = .038 and p = .033, respectively).

Table 3

Willingness to Try Alcohol, Group Means (Likert scale: 1 – Strongly Agree; 5 – Strongly Disagree)

Statement	Test	School A	School B	School C	School D	School E
One should try	Pre	3.71	4.66	4.32	4.19	4.50
alcohol sometime	Post	4.16	4.53	4.05	4.00	4.22

Scientific Knowledge

In the pre-test, only a few students knew that the human brain takes about 25–30 years to mature (intervention 4.3%; control 2.9%). In the post-test, 98.1% of the control group, students responded wrongly. Only 12.6% of the intervention group students did not know the correct answer (see Figure 2).
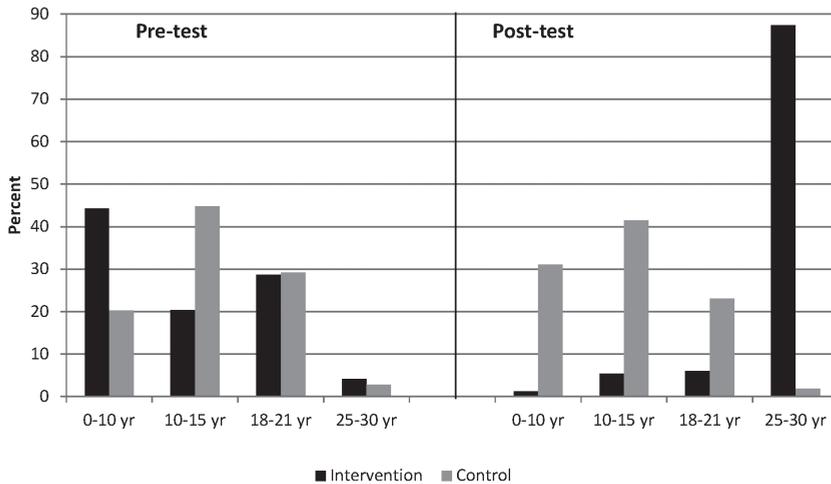

Figure 2. Comparison of students' perceptions of age of brain maturity

Initially, the vast majority of students (intervention group 66%, control group 80%) disagreed with a statement that alcohol improves activity of the sexual organs. In intervention schools A and B, the group mean shifted to a more negative direction in the post-test responses ($M_A = 3.1 \rightarrow 3.4$, $M_B = 4.1 \rightarrow 4.3$); however, the observed change was not statistically significant (p=.074, p=.112 respectively). On the contrary in the control group schools C, D and E attitudes changed significantly to a more positive direction ($M_C = 4.2 \rightarrow 3.9$, p = .02; $M_D = 4.2 \rightarrow 3.4$, p = .001; $M_E = 4,5 \rightarrow 4.0$, p = .008). Accordingly, in the control group some students started to believe that alcohol increases sexual activity.

Media

The questionnaire also charted students' use of media. Students were given five examples of media from which they had to choose their favorite one. The most liked medium was TV (38%), then books (19%), the Internet (18%) newspapers (17%) and radio (8%). In all schools, TV was the most liked medium, although in school D, it shared its leading position with the Internet.

In the pre-test 89% of all students agreed that songs, movies and advertisements play a role in their lives. Celebrities have psychological potential to influence Indian youngsters. Figure 3 shows a simplified three-level version of an original five-level Likert-scale question about students' willingness to accept their favorite celebrities' advice:
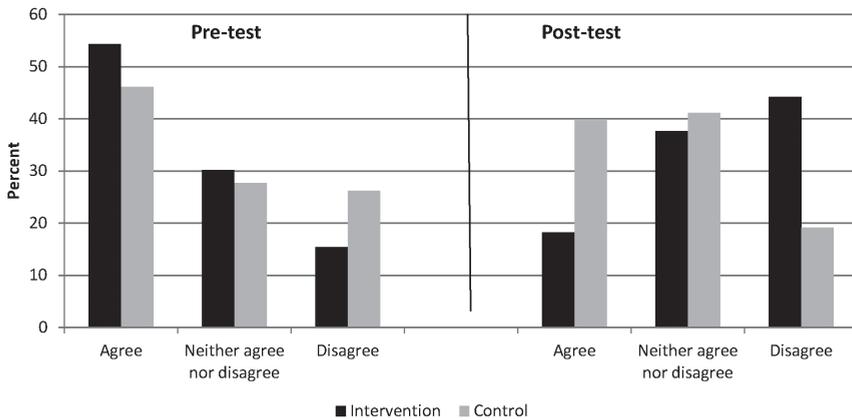

Figure 3. Comparison of student's willingness to accept advice from a favorite celebrity

Both the pre- and post-tests show significant difference between participating schools (pre-test $F_{4,141.2}$ = 7.72, p < .000, post-test $F_{4, 134.6}$ = 9.28, p < .000). A school examination reveals that before the intervention, students in school A were the most willing to accept their favorite celebrities' advice. However, in post-testing the students of both intervention schools were significantly (p < .000) more suspicious of what celebrities say (M_A = 1.7→ 3.5, M_B = 2.6→3.5), while in control schools, situation remained almost the same (M_C = 2.6→2.8, M_D = 2.9→2.6, M_E = 2.5→2.7; p > .05).

Table 4
Students' Perception about the Media (Likert scale: 1 – Strongly Agree; 5 – Strongly Disagree)

Statement	Group	Test	Group Mean	p-value
Media always tells the truth	*Control*	Pre-Test	3.17	.426
		Post-Test	3.22	
	Experimental	Pre-Test	3.02	.002
		Post-Test	3.40	
Media plays a role in increasing social problems	*Control*	Pre-Test	2.95	.002
		Post-Test	2.69	
	Experimental	Pre-Test	3.10	.000
		Post-Test	2.65	

In the post-test, students of the intervention group were significantly more suspicious about the media's credibility than in the pre-test. In the control group, the situation remained almost the same. In the pre-test 27% of intervention group and 31% of control group agreed that media may increase social problems. In the post-test the critical attitude increased significantly both in the intervention group (37%) and control group (38%).

Children's Perceived Role in Society

The students were asked if children could play a role in eliminating social problems. In the pre-test, School A students were least positive about their ability to contribute to their society. However, in the post-test, they were significantly more positive (p=.009) about their possibility to solve social problems. Strength of this agreement weakened in the control schools D and E in the post-test (Figure 4):
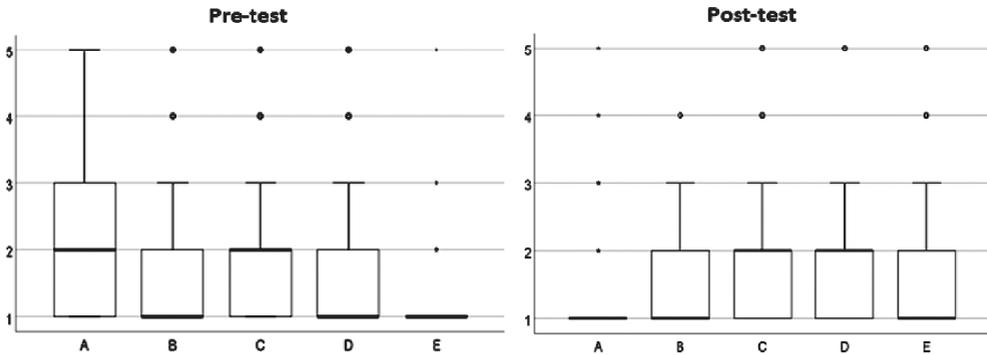

Figure 4. Students' perception about children's ability to eliminate their society's problems. (Likert scale: 1 – Strongly Agree; 5 – Strongly Disagree)

The effects of intervention were observable not merely in quantitative data. Also, in terms of the students' behavior changes, a large number of self-motivated actions emerged from the intervention.

Most groups initially chose activities involving social interactions e.g. organizing rallies with banners, posters and models to make people of the city, neighborhood and at homes aware of risks of alcohol. One group wanted to write a letter to the Chief Minister of their State to ban alcohol. However, the schools did not permit these activities. Instead, students were told to opt for in-campus activities like making charts, writing poetry and giving speeches about the effects of alcohol.

Nevertheless, some students initiated self-motivated dialogues about alcohol with drinking adults (see Table 5).

Table 5
Students' Self-Motivated Dialogues

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I talked to someone outside the school about this project, video or book.	53.7%	22.2%	8.0%	13.0%	3.1%
I talked about this project, video or book with someone who drinks.	36.2%	11.0%	19.0%	22.7%	11.0%

Inspired by these initiatives, some adults had promised to quit drinking. One School A student mentioned: "I showed the book to my uncle who drank every day and he decided to quit drinking altogether. Now no one drinks in my family."

Additional Responses

Additional questions about the CASC approach were asked from the intervention group in the post-test. Table 6 summarizes these responses:

Table 6
Additional Questions Asked of the Intervention Group

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I learned several new things about alcohol.	77.3%	17.8%	3.7%	1.2%	–
I think that I understand alcohol better now.	76.2%	18.9%	1.8%	1.2%	1.8%
I liked this idea of learning about a social issue through video, book & PBL.	72.8%	24.1%	2.5%	0.6%	–
Endorsement of products by celebrities is good.	11.0%	4.9%	27.6%	14.1%	42.3%

Students' were encouraged to ask if they did not understand something or if they wanted to have more information. During one question session, a School B student argued that his father drinks everyday for relaxation and that such drinking is harmless and recreational only. It was discussed that although alcohol temporarily relaxes the brain, it is also highly likely to cause multiple diseases. In response, the student still insisted that drinking will not harm his father.

One question raised by the students could not be answered either by the teachers or the researcher. This question was emailed to the relevant expert, the psychiatrist, who responded overnight. Within 24 hours, the response was publicly shared with the students who expressed complete satisfaction with the answer. Further to this incident, emails were sent to the Punjab State Educational Board to clarify the ambiguous textbook content about alcohol. These emails received no response at all.

Many students mentioned that the information about the health effects of alcohol on the body and the brain were the most important for them. Students deeply appreciated the psychiatrist's contribution to provide critical and well-founded content. Images of the places they knew already, advertisements by celebrities, brain images and animations were also well-received by a majority of the intervention students.

A student in School B wrote: "I liked it that the book had many images. It helped me as I wanted to show it to a person who is illiterate and drinks. I showed him the pictures and warned him." During project-presentations, unlike School B, only a few groups in School A explained their projects. Others were too shy to engage in public speaking.

Teacher's Perceptions

In her interview, the School B teacher mentioned that alcohol education in their school had been morality-based and lacked scientific-basis. She mentioned that teachers will understand the topic much better after this intervention. "We have tried to tell children about alcohol in other ways several times, but it was much more effective this time."

The interviewed teacher liked the documentary, which she saw as containing much information presented at a dynamic pace. Still, the book was also needed, because it helped students and the teacher to deepen the understanding of the topic. "Especially important were the images in the book, which helped children to find more clarity on the topic."

The teacher also mentioned a post-intervention change in students' attitudes. Earlier they had thought that they were grown-ups and they used to act that way. Now, they knew that their brains are still under development. The interviewed teacher confirmed that many students had discussed this information about alcohol with people at home or with neighbors who drink. Consequently, the influence of intervention did not stay inside the school walls. The teacher assessed the CASC approach as very useful: "If you want to talk about any other social issue as well, children will like it."

Discussion

According to the pre-test, students of participant schools had been exposed to alcohol in multiple ways. The Punjab's socio-cultural reality presumes alcohol consumption as normal and acceptable; therefore, these adolescents are vulnerable to early initiation (e.g. Bendtsen et al., 2013; Dhaliwal, 2017). CASC unearthed some false beliefs about alcohol among Punjabis that students can easily learn outside school. As an example, most students assumed that the human brain matures within the first fifteen years. Obviously, they did not realize that alcohol is especially harmful for adolescent's developing brain (see Walsh & Bennet, 2005; Giedd, 2008). The intervention presented these misconceptions in the light of scientific and social research.

During the pre-test, students in all schools asked for explanations of the terms 'media' and 'advertisement'. Despite regularly using media, students completely lacked a vocabulary for their daily experiences, indicating naive understanding about any prime information source. The willingness to accept a favorite celebrity's advice indicates students' vulnerability to market exploitations and an uncritical openness to adopt new ideas and behaviors (e.g. Share, 2009; Hofstede, 2001). The students from intervention schools learned about the role of the celebrities and the dualistic nature of media. They expressed displeasure over commercially-motivated celebrity endorsements, which clearly indicate critical thinking and second order learning (see Sterling, 2011).

For students, the opportunity to dialogue with experts was an opportunity to think, reflect, clarify and critically examine one's own assumptions and perspectives (see Bohm, 1996). The opportunity of the intervention probably intensified students' awareness of their personal and social assumptions, and their scientific knowledge about alcohol. Control group students also showed potential to reflect and think critically. However, changes in the control group were more scattered, individualistic and partial. The intervention group showed more coherent and transformative group-shifts.

This grounded approach to content development reflected the microcosm of Punjabi beliefs about alcohol. This connected the students' worlds inside and outside school which helped them in having convincing conversations outside school. Students could verbalize their disagreements and contrary opinions indicating that the intervention was a dialogic co-investigation and was not using indoctrinating techniques (Cayer, 2005; Jarvis, 2008). Despite listening to the opposing views, most intervention students preferred the coherent scientific view-point. Dialogue about alcohol at school produced

dialogues at home and in neighborhoods. Personal behavior changes, adoption of relevant information and students' self-driven attempts to create change indicate third-order transformative learning (Sterling, 2011).

It is probable that School A students were not particularly eager to argue for alcohol because they had witnessed alcohol-related deaths more frequently than School B students. There were no previous studies conducted in the region highlighting the connection between financial marginalization and school students' perceptions of alcohol. The pre-test responses showed that school A students were more likely to initiate early drinking (see Bendtsen et al., 2013). They also lacked confidence in children's ability to change their society. This finding agrees with previous research: the poorer populations feel powerless and are, therefore, more vulnerable to addictions (Berkman & Kawachi, 2000; Sandhu, 2006). In the post-intervention responses, this otherwise 'natural' trajectory changed: School A students' confidence-level soared significantly and coherently.

Interestingly, post-test results showed a decline in self-confidence among the control group. Similarly, in the post-test, more control group students believed that alcohol improves activity of the sexual organs than in the pre-test. Also, the number of students who were willing to try alcohol increased in the control group. These unexpected and unwanted results might be explained with the fact that some statements in the pre-test had aroused students' curiosity about alcohol among the students of the control group. Because of the lack of proper information, they had to ponder the topic by themselves or with their class-mates. The significant shift towards more positive attitudes towards alcohol in the control group implies that there are risks associated with inadequate and hasty opening of the topic.

Conclusions

There were limitations in this study. Because the participants were selected on a voluntary basis (convenience sample), the results cannot be generalized as it is done in a traditional experimental research. Also, details of conversations outside the school should have been asked of the control group students.

Multiple crises such as the environmental crisis, the financial crisis and some lifestyle disease crises are man-made offshoots springing from serious gaps in human thinking and knowledge. Educational solutions supporting sustainable development are urgently needed in all developing countries. Providing transformative sustainability education is a great opportunity as well as a hugely under-recognized challenge. Despite its urgency, this challenge has not been taken up with adequate seriousness.

Education can powerfully equip adolescents to make healthy choices; and it can save millions of naive adolescents from adopting misguided perceptions and indulging in voluntary self-harm. The CASC intervention aimed to scrutinize misinformation and pro-alcohol social beliefs in light of actual scientific information and contextual social knowledge. The intervention presented a reflective stance towards media contents, increased students' understanding and encouraged them to act like participating members of society. Both the results of the questionnaire and the feedback, from students and the teacher, confirms that the CASC approach is suitable not only for alcohol education but also other topics of ESD.

The CASC framework demonstrates that appropriate use of ICTs can support transformative education, and the intervention could be easily up-scaled for the urban

areas of the Punjab. However, perceptions of alcohol among inhabitants of rural areas may differ and may need modifications. One-size does not fit all.

The texture of a society lies in its approaches to meaning-making. Dialogue provides new references and meanings to understand old phenomena differently. Emergence of a more valid and rigorous context for conversations re-contextualizes the social meaning-making phenomena; thereby, changing the texture of society. Through the intervention, children learned new approaches of meaning-making e.g. they became more critical towards product endorsements by celebrities; and their personal behaviors changed noticeably. These changes are likely to outlast the intervention. School-level dialogues open doorways to social change.

A further study to compare print-based and video-based-media in a similar kind of intervention would be worth closer examination. Also, the use of ICT-supported CASC intervention for in-service teacher training is also worth exploring.

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