Network for Information and Digital Access

The impact of Science Literacy delivery methods - what works?

Summarised Strengths and Weakness

GROUP 3. Traditional publishing and journalism - print and broadcast

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NOTES
n.d. = no data provided

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Mechanism	Strengths	Weaknesses	Reference
17. Animations (Games & Simulation	- can facilitate the understanding of graphical representation, abstract concepts and changes across time or space - can provide active approaches to learning research methods and statistics		**A narrative literature review of games, animations and simulations to teach research methods and statistics** Boyle et al. 2014
18.Books			**NO REVIEWS**
19.Brochures			**NO REVIEWS**
20. Cartoons	- can help comprehension and communication in health care, especially in low literacy settings - pictographic health education can be effective regardless of race/ethnicity The combination of simple text and pictography can: - help to make the information understandable and successfully convey healthcare messages to people with low health literacy - increase the recall of instructions and medication information (Park and Zuniga 2016) Concept cartoons: - are based on everyday situations that don't appear to be scientific, so students lacking in confidence are less likely to be intimidated by the science and more likely to engage with them - are effective across geographical and cultural boundaries - can encourage learners to explore alternative ideas - can be a very effective way to challenge misconceptions - act as an effective stimulus for argumentation, including enabling students to co-construct arguments. - are not identified exclusively with formal learning settings - make it relatively easy for learners to engage in a language that is not their home language (Naylor and Keogh 2013)		**Concept Cartoons: What Have We Learnt?** Naylor and Keogh 2013 **Effectiveness of using picture-based health education for people with low health literacy: An integrative review** Park and Zuniga 2016

21. Comics	- can be a visually interactive and innovative educational tool - appeal to a wider audience across all age and ethnic groups because they employ everyday language that is almost universally understood and can be concurrently instructive and entertaining - the format allows for the integration of concepts, such as empathy, which otherwise may not be possible through traditional text - familiarity with the format - use of a language that can be understood by all age groups and across ethnic groups - can be uniquely suited to Generation Y (Muzumdar 2016) - low cost (Schneider 2014; Muzumdar 2016) - easily portable (Schneider 2014; Muzumdar 2016) - can potentially be a useful tool for education in public health crisis, especially in areas with high rates of illiteracy - allow sharing information through images without having to rely too heavily on text - don't require electricity or other technology, meaning they can be used in virtually any environment (Schneider 2014) - combine the benefits of visualization with powerful metaphors and character-driven narratives to make scientific subjects more accessible and engaging for a wider audience with STEM subjects - the multimodal nature of comics has the potential to increase readers' engagement and facilitate learning - often rely on the use of characters and situation models, which provide the basis for emotional attachment and self-reference - narratives can be a useful tool to address sensitive subjects, which may otherwise resist cognitive elaboration because of conflicting beliefs and/or lack of interest amongst the audience - map abstract scientific concepts on to everyday objects and experiences, helping the public to engage with the material at a more personal level (Farinella 2018)		**The potential of comics in science communication** Farinella 2018 **An Overview of Comic Books as an Educational Tool and Implications for Pharmacy** Muzumdar 2016 **Quantifying and Visualizing the History of Public Health Comics** Schneider 2014
22. Games	- can be a channel to reach those who are hard to reach with traditional health education methods - are engaging - offer opportunities for social interaction and practice of different skills in a safe environment and provide individualized feedback - can provide a remarkable resource in children's health promotion	- there are many commercially active videogames on the market and fewer sedentary health games - sedentary games require a lot of resources (e.g. a multidisciplinary team, substantial expertise, creativity, time, and funding) (Parisod et al. 2014)	**Gameplay Engagement and Learning in Game-Based Learning: A Systematic Review** Abdul Jabbar and Felicia 2015

	since, in general, children are interested in games regardless of age, gender, and background (Parisod et al. 2014) - can be an emerging intervention strategy to improve personal health (Lu, Kharrazi, and Baranowski 2016) - several classes of video games can provide a cultural tool capable of supporting three key elements of scientific literacy: content knowledge, process skills, and understanding the nature of science - can provide an authentic context in which players can demonstrate what they have learnt, as opposed to standardized tests - can facilitate learning both science content and science process skills - elements of video games could be used to improve classroom-based science education - are cultural and educational tools for science education and illustrate that games have unique strengths that can be used to augment science education (Morris et al. 2013) - games-based Learning (GBL) is a potentially engaging form of supplementary learning that could enhance the educational process (Hainey et al. 2016) - learning experienced through games is considered more sensory and playful if the learning content is accessible through a selection of virtual characters, environments, narratives, and multimedia elements - GBL helps students to develop skills and knowledge and strengthens their ability to handle the learning experiences provided by the games (Abdul Jabbar and Felicia 2015) - learning occurs naturally while playing games - games can enhance learning by connecting game worlds and real worlds - can facilitate collaborative problem-solving - can provide an effective environment for science learning (Li and Tsai 2013) - offer virtual environments in which players can become absorbed and engaged in the embedded science learning activities - playing good video games in itself is a process of thinking and learning (Cheng et al. 2015)	- gameplay must be supported with appropriate feedback and scaffolding (Abdul Jabbar and Felicia 2015)	**A narrative literature review of games, animations and simulations to teach research methods and statistics** Boyle et al. 2014 **The effects of on-line math games and e-books use on elementary student achievement** Carnahan 2014 **The use of serious games in science education: a review of selected empirical research from 2002 to 2013** Cheng et al. 2015 **A systematic literature review of games-based learning empirical evidence in primary education** Hainey et al. 2016 **Games and Diabetes: A Review Investigating Theoretical Frameworks, Evaluation Methodologies, and Opportunities for Design Grounded in Learning Theories** Lazem et al. 2016 **Game-Based Learning in Science Education: A**

	- games, animations and simulations provide active approaches to learning (Boyle et al. 2014) - could be used in health promotion and self-management intervention (e.g. diabetes) involving children (Lazem et al. 2016) - provide learners with opportunities to collaborate, problem-solve, and to develop a sense of place in a simulated world through self-discovery - can help to contribute to rich experiences that are often not found in a traditional classroom setting, which can provide skills that students need in the twenty-first century (Siko and Barbour 2013)		**Review of Relevant Research** Li and Tsai 2013 **Digital games for nutrition and healthy eating** Lu, Kharrazi, and Baranowski 2016 **Gaming science: the "Gamification" of scientific thinking** Morris et al. 2013 **Promoting Children's Health with Digital Games: A Review of Reviews** Parisod et al. 2014 **Game Design and Homemade PowerPoint Games: An Examination of the Justifications and a Review of the Research** Siko and Barbour 2013
23. Graphics			**NO REVIEWS**
24. Posters	- beneficial to conference organisers, authors and delegates - relatively inexpensive to produce, given that they can provide the audience with information that can be viewed by a number of individuals at their own pace - provide the viewer with a concise overview of the project/topic, which may often be supplemented by informal discussion with the author	- graphical design and physical appearance of the poster can determine its success in promoting knowledge transfer - are not well equipped to accommodate alternative learning styles - need to provide clear navigation in order to provide a sequential logic	**What is the evidence that poster presentations are effective in promoting knowledge transfer? A state of the art review** Ilic and Rowe 2013

	- can facilitate informed discussion between the presenter and audience - can promote active learning	- if not accompanied by an active intervention (e.g. oral presentation, physical interaction), the 'traditional' poster may only reach a limited proportion of its intended audience - are quite expensive in terms of the man hours, publishing costs and travel expenses	
25. Publications			**n.d.**
26. Radio			**NO REVIEWS**
27. Reports			**NO REVIEWS**
28. Television	- still the most popular source of information on health and illness - can influence the level of knowledge of the viewers, identification of simple symptoms - constitutes an important source of education in terms of prevention and avoiding risk behaviours - accessible and present in a wide spectrum of formats that make it possible to reach a vast and diversified group of viewers regardless of age, education and place of residence (Burzyńska, Binkowska-Bury, and Januszewicz 2015) - dramas and movies can be continuously and affordably distributed as streamed content - Entertainment education (EE) can be effective in health campaigns in developing countries, where traditional text-based literacy is limited - Information and Communication Technology (ICT) expansion in developed and developing countries has increased audiences' ease of access to entertainment narratives such as feature films and border-free TV productions - entertainment narratives can become a health information source for audiences around the world (Kato et al. 2017)	- broadcast messages do not focus on the content but the mere fact of making it public - television messages can be of low quality and of insufficient factual level refer to health topics - recipients ought to be aware that the series are fiction features and do not aim to faithfully reflect the reality, therefore the information needs to be treated with caution (Burzyńska, Binkowska-Bury, and Januszewicz 2015) - narratives may convey both negative messages (e.g. scenes of smoking, violence, and unsafe sex) and positive messages (e.g. scenes of safe sex, healthy diets, and non-smokers) (Kato et al. 2017)	**- Television as a source of information on health and illness – review of benefits and problems** Burzyńska, Binkowska-Bury, and Januszewicz 2015 **- Mapping research on health topics presented in prime-time TV dramas in "developed" countries: A literature review** Kato et al. 2017
29. Videos	- offers multimodal opportunities to learn, teach and present ideas - particularly useful for meeting specific educational needs (e.g. individuals with low literacy levels, communicating abstract concepts that may be challenging to demonstrate in classrooms) - can be paused, rewound and replayed as needed, supporting repeated and self-paced viewing to support learners	- infrastructural constraints, i.e. the reliance on power and connectivity, affordable access to the internet and mobile/smartphone ownership and use, particularly in rural and resource-deprived contexts - effectiveness can depend on additional instructional scaffolding around the intervention (e.g. instructor facilitation, materials and	**http://www.nida-net.org/en-gb/activities/connectwithscience/research/reports-and-bibliographies/videos/**

	- can serve as a less-resource intensive tool to provide standardized content across learners - can be made available and accessible through a variety of technologies and online platforms - have potential as a tool for agricultural extension, farmer-to-farmer exchange and health literacy in developing countries - technological affordability - flexibility of potential use -scalability across multiple platforms, technologies and devices - videos can be readily modified and edited to allow use and application across diverse cultural settings	participant activities - reach is dependent on physical location and timing of videos in order to enable inclusive participation (e.g. greater involvement of females in rural areas)	

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