

Report on design guidelines for educational programs

Een onderzoeksrapport in het kader van het AdLit SBO project



Dit document maakt deel uit van het 'AdLit' (Advertising Literacy) onderzoeksproject. AdLit is een vierjarig interdisciplinair onderzoeksproject rond reclamewijsheid dat gefinancierd wordt door het IWT (Agentschap voor Innovatie door Wetenschap en Technologie). Het doel van het project is na te gaan hoe we de reclamewijsheid van kinderen en jongeren kunnen verhogen, zodat ze leren omgaan met reclame en opgroeien tot geïnformeerde consumenten.

Het AdLit consortium bestaat uit de volgende partners:

Universiteit Gent: Onderzoeksgroep CEPEC, Vakgroep Onderwijskunde en Onderzoeksgroep CJS

Universiteit Antwerpen: Onderzoeksgroep MIOS en Departement Marketing

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EXECUTIVE SUMMARY

Aim: The general aim of this report is to uncover a number of design guidelines, which are important in the process of developing educational material to enhance minors' advertising literacy. Therefore, it is necessary to gain insight into important theories in the field of learning and instruction.

Main findings: This report provides an overview of key principles inherent to *design-based research* (DBR), effective prevention programs as well as the learning theory constructivism. These frameworks in the field of learning and instruction were selected because of their increased popularity last decades. By consulting literature on design-based research, we get insight into eight principles which have to be considered during the whole process of designing and implementing educational material. These principles are: (1) depart from a problem in practice; (2) theoretically oriented; (3) development of practical design principles; (4) research in real educational settings; (5) collaboration between practitioners and researchers; (6) design and testing a significant intervention; (7) multiple interventions, and (8) the use of mixed methods. McKenney and Reeves (2012) moreover created a model for conducting DBR. This model should lead to educational design processes in which the characteristics of DBR need to be present. In addition to this important methodology, Nation et al. (2003) identified nine principles that determine the effectiveness of prevention programs. An overview: (1) comprehensive; (2) varied teaching methods; (3) sufficient dosage; (4) theory driven; (5) positive relationships; (6) appropriately timed; (7) socioculturally relevant; (8) outcome evaluation; and (9) well-trained staff. Finally, constructivism became a well-known learning theory in education last decades. Associated learning principles are active learning, authentic learning, collaborative learning, assessment (for learning) and scaffolding. If possible, we already make a link between advertising literacy education and both the general principles of Nation et al. (2003) and the constructivist learning principles. By designing and implementing educational material on advertisements, we need to keep all abovementioned principles in mind as much as possible.

INHOUDSTAFEL

Executive summary	3
Introduction	5
Design-based research	5
1. Challenges of design-based research	8
Design and construction	9
2. General principles of effective prevention programs	9
3. Constructivism	12
Active learning	12
Authentic learning	13
Collaborative learning	13
Assesment	14
Case study: Promoting advertising literacy in a constructivist classroom?	15
Role of teachers?	18
Involving parents in advertising literacy education	19
Conclusion	21
References	22

INTRODUCTION

When developing educational material to enhance minors' advertising literacy, it is important to consult literature on *design-based research* (DBR). "Educational design research can be defined as a genre of research in which the iterative development of solutions to practical and complex educational problems also provides the context for empirical investigation, which yields theoretical understanding that can inform the work of others" (McKenney and Reeves, 2012, p. 7).

In what follows, we firstly summarize characteristics and challenges of design-based research given by several authors. We also present a generic model, which is developed by McKenney and Reeves (2012), for conducting design-based research in education. Secondly, general principles of effective prevention programs (Nation et al., 2003) as well as the learning theory *constructivism* and associated learning principles (e.g. active learning, collaborative learning, authentic learning, etc.) are described below. Last decades, constructivism became a dominant theory in education. It is based on the idea that knowledge is actively constructed by individuals (Karagiorgi & Symeou, 2005). Therefore, instruction can be seen as a process of supporting construction of knowledge rather than transferring knowledge (Duffy & Cunningham, 1996). If possible, we made a link between advertising literacy education and the general principles of Nation et al. (2003) as well as the constructivist learning principles.

DESIGN-BASED RESEARCH

In the beginning of the 21st century, design-based research (DBR) evolved and was described as a practical research methodology that could bridge the gap between educational research and practice (Anderson & Shattuck, 2012; Edelson, 2002). The focus of DBR is on designing and exploring educational innovations, to gain insight into why, when and how a theory-driven innovation works in practice (The Design-Based Research Collective [DBRC], 2003). Nevertheless, McKenney and Reeves (2013) remark that DBR is not a new research methodology. For example, use is made of well-established quantitative and qualitative research methods as well as of existing norms for sampling, data collection and data analysis. Several authors (e.g. Anderson & Shattuck, 2012; Barab & Squire, 2004; DBRC, 2003, McKenney & Reeves, 2012, etc.) summarize important features of this well-used research approach in the Learning Sciences (Barab & Squire, 2004; DBRC, 2003).

A first important feature is that DBR **departs from a problem** in practice that is both scientifically and practically relevant (Edelson, 2002; McKenney and Reeves, 2013). Educational research has been criticized for a long time because of its weak link with practice. For this reason, some pleaded for an increased focus on the problems and issues that confront everyday educational practice. DBR is one promising avenue for improving the relevance of

educational research (DBRC, 2003; McKenney and Reeves, 2012). Secondly, DBR is **theoretically oriented**. In DBR, scientific understanding is used to frame (the results of) inquiry and to give shape to a solution for a real educational problem. The latter is rather unusual compared with other research approaches. In addition, an important goal of DBR is to generate theories on learning and teaching which can be relevant for other educational designers and practitioners (Edelson, 2002; McKenney & Reeves, 2012; Wang & Hannafin, 2005). The theoretical understanding is produced through the entire process of DBR. The resulting conjectures and empirical findings provide building blocks for theory (McKenney & Reeves, 2012). In short, “Design-based research is both based on, and conducted in order to generate theory: the simultaneous pursuit of theoretical goals differentiates design-based research from formative evaluation” (Wang & Hannafin, 2005, p. 6). Accordingly, the development of **practical design principles** also characterizes DBR. Researchers have to demonstrate the value of the designed educational intervention in the local context, but they also have to look further than the specific design context and have to be alert to what aspects of the intervention can be generalizable to other contexts. Through the process of generalization, it becomes possible to develop domain theories, design frameworks, and design methodologies (Anderson & Shattuck, 2012; Edelson, 2002). Wang and Hannafin (2005, p. 19) formulate it as “DBR strives to balance local effectiveness with design principles and theory development”. A fourth feature of DBR is that research needs to be conducted in authentic settings, that is, in real **educational contexts** (Anderson & Shattuck, 2012; Barab & Squire, 2004; DBRC, 2003; Wang & Hannafin, 2005), rather than in laboratory settings which are isolated from everyday practice (Wang & Hannafin, 2005). This ensures a high ecological validity (McKenney & Reeves, 2012). Fifthly, a **collaboration between researchers and practitioners** is required to produce meaningful change in practice (Anderson and Shattuck, 2012; Barab & Squire, 2004; DBRC, 2003; McKenney and Reeves, 2012). In the beginning of a research project, identification and exploration of a problem should be done together with those who are confronted with a particular problem. By doing interventions in a later phase, educational researchers can learn from practitioners, for example when they suggest some adaptations to the intervention/design (McKenney and Reeves, 2012). Another feature is the **design and testing of a significant intervention** - like a learning activity, a type of assessment, a technological intervention, etc. - to create an improvement in (local) practice or to overcome a problem. As mentioned above, the design and testing of an intervention have to be collaborative tasks of both practitioners and researchers (Anderson and Shattuck, 2012). Subsequently, conducting **multiple iterations** is typical for DBR. Educational interventions are created through multiple iterations or in other words continuous cycles of investigation, development, testing and refinement (Anderson and Shattuck, 2012; Barab & Squire, 2004; DBRC, 2003; McKenney & Reeves, 2012). Several iterations allow to systematically adjust various aspects of an educational intervention in ways that might lead to a better product (Barab & Squire, 2004; DBRC, 2003). Finally, DBR uses **mixed methods** to assess and refine an intervention. More specifically several methods for data collection (e.g. survey, interview, observation, ...) and analysis, which are widely known in quantitative and/or qualitative research, are used (Anderson & Shattuck, 2012; DBRC, 2003; Wang & Hannafin, 2005). Wang and Hannafin (2005) argue that qualitative documentation methods are especially useful in DBR. “Designers document closely their research procedures, anomalies, and interpretations and understandings using research journals and field notes: The more relevant the available documentation, the greater the decision-altering potential and the more persuasive the descriptions of interventions and findings” (Wang & Hannafin, 2005, p. 17).

A generic model for design-based research in education, shown in Figure 1, was created by McKenney and Reeves (2012). This model should lead to educational design processes in which the abovementioned characteristics need to be present. The model has three important features, namely:

(1) Three core phases

- a. **Analysis and exploration:** A first step in this phase consists of conducting a literature review to gain insight into the problem, context and other relevant topics. In a second step, researchers collaborate with practitioners, among others, to better understand their needs. In a third and final step similar problems and solutions are explored.
- b. **Design and construction:** *Design* refers to generating, exploring and considering potential solutions to the problem. Both practical and/or theoretical grounding for the several options are sought. During *construction*, the desired solution will be effectively manufactured. A prototyping approach is often used for this construction process in which different approximations of the preferred solution are (re-)created.
- c. **Evaluation and reflection:** *Evaluation* is interpreted in a broad sense, it is seen as the empirical testing of a constructed intervention (in initial, partial or final form). In addition, McKenney and Reeves (2012) suggest to critically reflect on the development and research phase (i.e. theoretical inputs, empirical findings, and subjective reactions). Empirical findings and critical reflection are used to accept, refine or refute (prototypes of) the preferred intervention.

(2) Dual focus on theory and practice. The model of McKenney and Reeves (2012) highlights two main outputs of DBR, namely *maturing interventions* and *theoretical understanding*. The difference between both of them is that the first output directly contributes to practice and the latter results more in theoretical perspectives. Indirectly, it is possible that *theoretical understanding* contributes to practice if others are going to use the ideas to build new interventions and vice versa.

(3) Indications of being use-inspired. An implementation perspective is expected during the entire process. At first, this means getting insight into real contextual opportunities and constraints. It is therefore necessary that educational professionals are involved from the start. Later, the educational design will be tested in practice whereby educational practitioners can function as co-designers by offering valuable ideas.

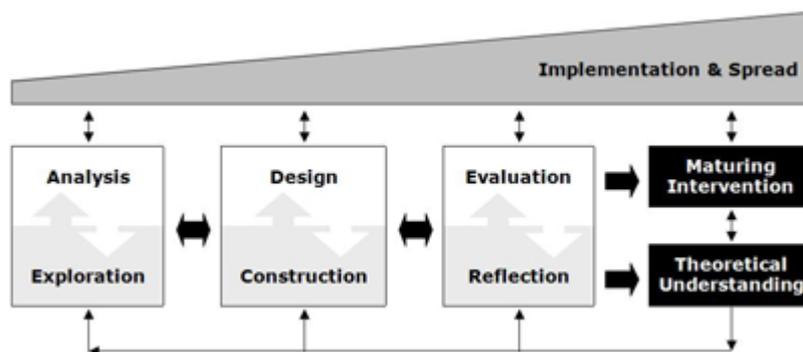


Figure 1. Generic model for conducting design research in education (McKenney & Reeves, 2012, p.77)

1. Challenges of design-based research

Design-based research has benefits, but there are also limitations and several critiques. Some of them are discussed below.

A first challenge is **immature methodology**. This term, used by Wang and Hannafin (2005), means the difficulty to determine when a research project is complete, because standards to judge the effectiveness of a design do not exist. Another, closely related, challenge is **generalizability**. Even when a design proved to be effective in a specific context, it is difficult to determine whether or not design principles can be generated to other contexts (Anderson & Shattuck, 2012; Wang & Hannafin, 2005). Moreover, naturalistic findings cannot just be generalized because there are always teachers, students, school board, etc. who create specific contexts. Moreover, the presence of researchers in the classroom during the intervention directly influences the context. This inadvertently affects research outcomes (Barab & Squire, 2004; Wang & Hannafin, 2005). Thirdly, questions can be raised about **objectivity, reliability and validity** of DBR. To promote objectivity and reliability, it is necessary to triangulate multiple methods for data collection and analysis, to repeat analyses during iterations and to use (and create) standardized measures or instruments. Validity of findings is met by the collaboration with practice and the several iterations that lead to increasing alignment of theory, practice, design, and measurement over time (DBRC, 2003). Next to that, DBRC (2003) points to a logistical challenge, namely maintaining a productive **collaboration with participants** in the research project. A single line of DBR often consists of multiple iterations, a process that is time-consuming. Additionally, designer-researchers have the role of both designer and researcher, so their task moves beyond providing explanations of, to developing interventions for (Barab & Squire, 2004). Finally, the challenge of **data utilization** is mentioned by Wang and Hannafin (2005). DBR imposes documenting the whole design process and using several research methods in real educational contexts. This results in large amounts of data requiring both resources and time to analyse. Therefore, a lot of data are discarded by reason of limited time and resources.

DESIGN AND CONSTRUCTION

In the AdLit project, steps have been taken in the first phase of analysis and exploration of the model set up by McKenney and Reeves (2012, *Figure 1*). A curriculum analysis (Adams, Schellens, & Valcke, 2015a) and an analysis of existing educational packages (Adams, Schellens, & Valcke, 2015b) about advertisements were conducted. In the second phase of design and construction, general principles of effective prevention programs, as well as the learning theory constructivism and associated learning principles can be helpful. For this reason, both of them are explained below.

2. General principles of effective prevention programs

Nation and colleagues (2003) identified nine principles that are typical for effective prevention programs by using a review-of-reviews approach in which 35 journal articles, books or book chapters were reviewed across four areas (risky sexual behaviour, substance abuse, school failure, and juvenile delinquency and violence). Based on a quote of Meeus, Walrave, Van Ouytsel and Driesen (2014, p. 6), namely “Advertising literacy education is one of many types of educational interventions aimed at helping children and young people cope with the harmful components of societal realities. It resembles other forms of education, including programs focusing on traffic safety, drug prevention, and environmental awareness”, we would like to argue that the principles as formulated by Nation et al. (2003) are also applicable to advertising literacy education. For every principle below, we will indicate how it can be applied in the context of advertising literacy education. Nation et al. (2003) moreover clustered the nine principles in three broad categories of prevention programming:

Principles related to program characteristics

- (1) **Comprehensive.** Two dimensions can be distinguished for comprehensive programming: *multiple interventions* and *multiple settings*. The first one points to the importance of conducting several interventions to address the problematic behaviour. The latter means that multiple settings (*e.g. family, peers, schools etc.*), which have an impact on the development of the problem behaviour, need to be engaged.

Multiple settings and interventions in the context of advertising literacy education?

In the context of advertising literacy education, this can be obtained by setting up interventions in both primary and secondary education, in home context (e.g. giving homework to involve parents), in youth movement, etc. Moreover, comprehensive programming can also be understood as tackling all dimensions (i.e. cognitive, affective and moral) of advertising literacy.

- (2) Varied teaching methods. This principle refers to the need for an active, skills-based component in prevention programs, like interactive instruction and hands-on experiences (see *constructivism* and *the case study* below).

AdLit games?

Games aimed to improve minors' advertising literacy are recently developed in Flanders. Using this games allows us, inter alia, to vary in teaching methods. The link to the games: <http://www.reclamewijs.ugent.be/>

- (3) Sufficient dosage. A synonym for dosage is program intensity, measured in quality and quantity of contact hours. Important aspects are the number of sessions, the session length, spacing of session, and the length of the total program. Enough intervention might be necessary to have an effect. Nation et al. (2003) suggest to organize, if necessary, follow-up sessions.

But...

Vanderhoven, Schellens and Valcke (2014a) - who organized focus groups with teachers about designing educational material on a similar topic (i.e. privacy on social network sites) - conclude that teachers emphasized that a prevention program should be to the point and short in time. A combination of the principles comprehensive and sufficient dosage seems to be difficult to realize, due to teachers' concern about time-consuming programs.

- (4) Theory driven. Although this principle seems basic, it is often overlooked. Nation et al. (2003, p.452) define *theory driven* as follows "programs have a theoretical justification, are based on accurate information, and are supported by empirical research". Both etiological theories (i.e. focus on the causes of the problem) and intervention theories (i.e. focus on finding the best methods to tackle a problem) are important.

Advertising literacy education?

- Etiological theories. The AdLit project especially focuses on online advertising forms. As Blades, Oates and Li (2013) stated, all the research on both effects of advertising and minors' understanding of advertising has centred on traditional advertising. Nevertheless, much marketing aimed at children is via Internet nowadays. In the AdLit project, we can rely on research that focuses on minors and traditional advertising forms, but we have to keep in mind that research findings might be different when children are confronted with new (online) advertisements. Nowadays, the commercial content is increasingly integrated into other media content of websites, television programs, etc. Besides integration, new advertising forms are more interactive than traditional forms. Advergaming is perhaps the most obvious example of an interactive advertising form (Cauberghe, de Pelsmacker, Hudders, Panic, & Destoop, 2012). Several authors (e.g. Blades, Oates, & Li, 2013; Rozendaal, Lapierre, van Reijmersdal, & Buijzen, 2011) already stated that minors' advertising literacy toward non-traditional advertisements is lower than for rather traditional ones.
- Intervention theories. Design-based research (abovementioned) will be used as methodological framework to develop educational material aimed to instil children's advertising literacy.

- (5) Positive relationships. Nation et al. (2003) identified in their review of research an association between a programs' opportunities to develop strong, positive relationships (e.g. parent-child relationships, peer group, etc.) and positive outcomes of the intervention (e.g. minors' change of attitude) (see *involving parents in advertising literacy education* below).

Principles related to matching the program with the target population

- (6) Appropriately timed. Interventions should occur in a child's life on a moment when it will have maximal impact. Developers of a prevention program have to take into account developmental needs (e.g. Piaget's cognitive developmental theory) of participants.

Advertising literacy education?

To meet this principle, educational material will be designed for both primary and secondary education in the AdLit project. To determine for what grades specific, a literature review will be conducted to figure out what ages are important turning points in order to the processing of advertisements.

- (7) Socioculturally relevant. It is important that a prevention program is tailored to the community and the associated cultural norms. It is therefore recommended to involve the target group in program planning and implementation (see *Design-based research* abovementioned).

Principles related to implementation and evaluation of prevention programs

- (8) Outcome evaluation. Program evaluation can be interpreted as determining the effectiveness of the intervention. In addition, programs need to have clear goals and objectives.

But...

Determining the effectiveness of existing educational packages about advertisements is rarely done. Several researchers (e.g. Eagle 2007; Rozendaal, Lapierre, Van Reijmersdal, & Buijzen, 2011; Van Ouytsel, Meeus, Walrave, & Driesen, 2014) therefore highlight the importance of program evaluation. In the AdLit project, we want to meet this shortcoming by using the practical research methodology *design-based research* (abovementioned).

- (9) Well-trained staff. The implementation of a prevention program is facilitated when teachers are sensitive and competent regarding the topic. Additionally, they must receive sufficient training, support and supervision.

Advertising literacy education?

A manual for teachers is relevant in the context of advertising literacy education, including step-by-step instructions, background information on advertisements, etc. (Van Ouytsel et al., 2014).

3. Constructivism

The rationale behind constructivism is that meaningful learning can be seen as an active process of constructing knowledge. According to the constructivist theory, knowledge is the result of personal interpretations, influenced by learners' gender, age, prior knowledge, ethnic background, etc. (Duffy & Cunningham, 1996; Karagiorgi & Symeou, 2005; Snowman & Biehler, 2003). This does not mean that consensus between different persons is impossible. By sharing multiple perspectives (e.g. systematic, open-minded debates and discussions), it becomes possible for individuals to create or adapt their personal views. Consequently, pupils need to be provided opportunities to share and discuss multiple perspectives (Snowman & Biehler, 2003). Therefore, constructivists make a plea for "instructional environments that are student-centred, student-directed, collaborative, supported with teacher scaffolding and authentic tasks" (Karagiorgi & Symeou, 2005, p.19). Below, the most important learning principles are described.

Active learning

According to Prince (2004), it is difficult to provide a generally accepted definition for active learning. Although several authors have their own definition of the learning principle, an attempt to a common definition is "any instructional method that engages students in the learning process. (...) Active learning requires students to do meaningful learning activities and think about what they are doing" (Prince, 2004, p. 223). Active learning is often contrasted to a more traditional way of teaching that is based on students who passively receive information from their teacher (Prince, 2004).

Active learning and advertising literacy education? Study of Banerjee and Greene (2006)

This study of Banerjee and Greene (2006) examined attitudinal and cognitive responses of adolescents to two media-literacy intervention approaches, which are designed to reinforce adolescents' attitudes toward smoking. As indicated above, two intervention workshops with another focus were designed by Banerjee and Greene (2006):

- (1) Workshop1 with a focus on **analysis**: adolescents had to analyse and critique both cigarette and antismoking ads;
- (2) Workshop 2 with a focus on **production**: adolescents had to analyse and critique cigarette advertisements, followed by the creation of their own antismoking ads.

Most important results:

- Adolescents in the production workshop liked the intervention more. Students preferred creating their own messages, compared with analysing messages designed by others. Moreover, Tyner (1998, in Banerjee & Greene, 2006) argues that creating a message offers an opportunity for reflecting on their learning process;
- The production workshop is more successful than the analysis workshop in reducing positive attitudes against smoking.

Authentic learning

A synonym for authentic learning is *situated learning*. Several authors (e.g. Duffy & Cunningham, 1996; Snowman & Biehler, 2003) underscore that learning will be more meaningful when it takes place in a realistic context. However, learning and instruction in schools are mainly decontextualized whereby students fail to use what they learned in real-life situations (Snowman & Biehler, 2003).

Use of advertisements in an educational context: ethical issue?!

Since the 1980s there is a trend of commercial marketing in American public schools (McDermott, Hastings, Stead, Carrigan, & Harris, 2008). This commercialization has been prompted by financial pressures. Although research into the effects of advertising in schools on children is scarce, politicians, teachers, parents, researchers etc. have expressed concern about the potential negative impact on children's health, values, body-image, self-esteem, learning processes, and personal development (Public Citizen, 2012; McDermott et al., 2008; Richards, Wartella, Morton, & Thompson, 1998). However, others believe that it is unlikely that advertisements in schools have a negative influence (Richards et al., 1998). They argue that minors are daily confronted with advertising, so commercial marketing in schools is no problem in their opinion. Nevertheless, minors trust their schools to keep control over presented content whereby advertisements in schools are perceived to be more credible than those that are viewed at other places (Austin, Chen, Pinkleton, & Johnson, 2006; McDermott et al., 2008; Richards et al., 1998).

In Flanders, a radical ban of advertising in schools seems unrealistic because many schools work together with the private sector. Schools are autonomous in making decisions about the use of advertisements, for example, during an open day of the school. Yet, the local independence is bounded by decree principles. Learning content and materials, for instance, must be shielded from advertising. The use of advertisements in the classroom is in principle prohibited (Ministerie van de Vlaamse Gemeenschap, 2003). Nevertheless, in order to instil minors' advertising literacy it is desirable to work with authentic advertising examples. Therefore, a Flemish commission recently (2014) discussed about this issue and provided advice on the use of commercial messages in educational material aimed to enhance minors' advertising literacy. The commission recognizes that minors are daily confronted with different forms of advertising. To their opinion, schools are responsible to instil minors' advertising literacy. Learning material for this purpose can therefore contain - to some extent - authentic advertisements (Commissie Zorgvuldig Bestuur, 2014). By using real advertisements, the learning material created by the AdLit project will be as authentic as possible.

Collaborative learning

Constructivism emphasizes the importance of collaborative learning. This instructional strategy allows to share, compare and understand multiple perspectives as well as to create or adapt personal views, which can be seen as basic assumptions of constructivism (Duffy & Cunningham, 1996; Karagiorgi & Symeou, 2005; Snowman & Biehler, 2003). Moreover, collaborative learning provides, inter alia, variation in classroom activity and insight into how to cooperate and work together (Duffy & Cunningham, 1996).

collaborative learning versus Individual reflection

Although constructivism strives to create a collaborative learning environment, based on theories about peer influence (during adolescence) (e.g. Sumter, Bokhorst, Steinberg, & Westenberg, 2009) it can be supposed that individual reflection is also important to improve minors' advertising literacy. Especially in secondary education, since Sumter et al. (2009, p. 1010) argue that "peer influence appears to be an integral part of adolescent relationships". As children move into adolescence, shaping an own identity and conforming group expectations become more important. This results, for example, in consuming specific popular teen brands (John, 1999). Peer pressure can consequently lead to some specific behaviours, such as the eating habits, how to dress, etc. (Gil, Kwon, Good, & Johnson, 2012). Therefore, it can be hypothesized that the opinion of peers has an impact by instilling minors' advertising literacy (Vanderhoven, Schellens, & Valcke, 2014b).

Vanderhoven, Schellens and Valcke (2014b) - who created educational material on a similar topic, in particular risks on social network sites (SNSs) - demonstrate that both collaborative learning and individual reflection are instruction strategies that can raise awareness of risks on SNSs. However, only the course with a focus on individual reflection had an impact on attitudes and behaviour in their intervention study.

Individual reflection during advertising literacy education: using think-aloud?

The difference between *think-aloud* and *thought-listing* is that the first means that students have to verbalize their thoughts during performing a task. Additionally, thought-listing can be defined as providing your thoughts after performing a specific task. Rozendaal, Buijzen and Valkenburg (2012) investigated which method is the most effective in increasing children's critical processing of advertising. Firstly, they conclude that there is no variation in the number of cognitive and affective critical thoughts children produced. Secondly, there is a difference in the effectiveness of both methods in reducing children's susceptibility to advertising. Regard to the think-aloud method, children produce both cognitive and affective critical thoughts towards an advertisement, in contrast to thought-listing that only elicits affective thoughts.

Assesment

Assessment is traditionally an activity undertaken when learning is finished. However, assessment acquires a new interpretation within constructivism. When learning outcomes are individually constructed - claimed by proponents of constructivism - it is difficult to set standards for assessing learning. Therefore, the focus is increasingly on the learning/thinking process, and not only on results (Duffy & Cunningham, 1996; Karagiorgi & Symeou, 2005). Birenbaum (2003) describes this evolution as a shift from a *test culture* to an *assessment culture*, according to Garder (2006) we evolved from *assessment of learning* to *assessment for learning*. In a test culture, called assessment of learning by Garder (2006), students receive decontextualized tests aimed to score the result at the end of instruction (in Montrieux, 2012). Conversely, the distinction between learning and testing is blurred in an assessment culture (i.e. assessment for learning) (Birenbaum, 2003; Karagiorgi & Symeou, 2005). This requires students who are actively involved in the assessment process (Montrieux, 2012), for example an important element is the ability of students to explain and defend decisions, that stimulates reflection and

metacognitive skills (Karagiorgi & Symeou, 2005). This evolution in evaluation of learning has different innovative forms of assessment as consequence, for instance performance assessment, portfolio's, authentic assessment, self/peer/co-assessment, etc. (Duffy & Cunningham, 1996; Karagiorgi & Symeou, 2005; Vanderhoven, Schellens, & Valcke, 2011).

Assessment in advertising literacy education?

Meeus et al. (2014) remark that existing educational packages aimed to improve minors' advertising literacy and their related teacher manuals contain only a few assessment options that teachers can use to test students' knowledge and measure their progress after accomplishing an intervention. In line with abovementioned changes regarding evaluation of learning, we want to discover which assessment forms can be used by teachers in the context of advertising literacy.

Case study: Promoting advertising literacy in a constructivist classroom?

Learning with and about advertising in chemistry education with a lesson plan on natural cosmetics – a case study (excerpt from Belova & Eilks, 2015, p. 581-582)

One of the goals of science education is to prepare students to live in society (Elmose and Roth, 2005; Hofstein et al., 2011) as well as to raise the relevance of science education and students' perception thereof (Lee and Erdogan, 2007; Stuckey et al., 2013). Different theoretical views (Hofstein et al., 2011) have lent support to the need for change, specifically a move toward more societally oriented science education with a more thorough focus on argumentation and decision-making skills. Within this framework one sub-set of innovations has been based on the use of socio-scientific issues (SSI) in the science classroom (Sadler, 2004). SSI-based science education provides motivating contexts to promote meaningful science learning. Simultaneously, SSI-based science education becomes a catalyst which promotes general educational skills, especially argumentation and decision-making (Albe, 2008) (*basic assumption constructivism*). SSI-based science education on advertising is special, because in addition to acting as a medium for learning (**'learning with advertising'**), advertisements themselves can also become SSI (**'learning about advertising'**). Better still, we can do more than just illustrate certain scientific topics through examples of appropriate advertising. We can also discuss the scientific information used in advertising, exactly how it is presented, what effect it has on the credibility of the ads, whether incorrect and/or misleading information is used, etc. (*moral advertising literacy*).

Within the SSI movement, the socio-critical and problem-oriented approach to science education has been suggested in Germany (e.g. Marks and Eilks, 2009, 2010). This approach attempts to construct a consistent model in which to operate SSI-based science teaching (Marks et al., 2014). It was developed into a five-step model covering each of the required curriculum units. The introduction to a topic is performed using authentic media artifacts, e.g. newspaper articles or (in our case) advertising items (*authentic learning*). The topics selected must allow for real decisions to be negotiated by the learners. The activities performed within the

lesson plan challenge students to make up their own minds and to verbalize their opinions on the topic in an open forum. Such conditions allow the expression of one's personal point-of-view without the individual being judged, censored or condemned as an outsider by the rest of the group (**Basic assumption constructivism**). Reflection upon how society handles SSI is carried out by mimicking an authentic societal practice dealing with science-related information used by the public. The module developed for natural cosmetics is based on the five-step model by Marks and Eilks (2009). It additionally includes all four of the potential roles of advertising in the science classroom (...).

- (1) Motivation: advertising is used as an introduction to a new science topic in the science classroom to create meaning for the students and increase motivation.
- (2) Contextualization: advertising is used to contextualize science-related tasks, e.g. science-related calculations or inquiries. Advertising is used to provoke and motivate experimental activities or theoretical tasks.
- (3) Promotion of critical thinking by reflecting upon the role of science-related information in advertising: information borrowed from science- or technology-based advertising is reflected upon with respect to its reliability, validity, and manipulative character. This includes factors such as suggestive or misleading advertising, advertising with false or falsified scientific and technical information, etc.
- (4) Meta-reflection of the interplay between science and advertising: the role of science and technology (specifically science- and technology-related information) in advertising is reflected upon by the learners. Such learning focuses on the question of how science-related information enters into and is employed by advertising.

The issue of natural cosmetics is controversial and rather complex. There are no binding definitions; several label types can also be found on the market. Therefore, the main goal of the module was to encourage students to critically deal with advertising for natural cosmetics. This included both showing the learners how cosmetics advertising employs scientific information to convince potential customers and providing the students with relevant, corresponding chemistry content knowledge which can help them develop a critical stance. The introduction to natural cosmetics is carried out with the help of authentic claims, which are frequently used for advertising purposes. These include statements and personal claims covering certain beliefs about natural cosmetics. The selection includes such statements as 'The less chemistry in a product, the better', 'Natural cosmetics are better for your skin' and 'Natural cosmetics are chemistry-free'. Each student receives a green card (signaling agreement) and a red card (signaling disagreement) and must rate each of the statements with a color. Before learning the chemistry background of the topic, students receive a worksheet with an activity called 'reflection on advertising slogans' (Belova and Eilks, 2014). The pupils are given ten authentic slogans on the worksheet, which must be rated regarding their attractiveness, scientific background information and credibility (**individual reflection – affective and moral advertising literacy**). The rating is carried out through three 'thermometers' located next to each slogan. Potential correlations between the three dimensions are also discussed (e.g. scientifically based slogans are more likely to be less attractive). After the discussion the work sheets are collected by the teacher. A collage with different advertisements for

natural cosmetics is then shown to the students. Among the offerings, claims highlighting the absence of certain chemicals (paraben free, silicone free, etc.) as well those emphasizing products which supposedly contain few to no (synthetic) chemicals prevail. Again, the credibility and scientific background of the slogans is discussed. The students are then asked why they think advertising selects this kind of information and which reactions are provoked by it.

Before the students start exploring the particular ingredients of natural cosmetic products more closely, they learn about the basic components of skin creams and body lotions, which are representative of general cosmetic products. This is followed up with a group activity about particularly controversial ingredients in cosmetics (*collaborative learning*), which are often not contained in explicitly “natural” products. The students mimic a fictional meeting in which representatives of a risk assessment institute evaluate product ingredients and rate their risks. The students act as experts and are divided into six groups. Two groups each receive one of three ingredients (palm oil, parabens, silicones) so that every ingredient is represented by two expert groups. With the help of texts covering the advantages and disadvantages of each of the ingredients, the expert groups have to reach a consensus and give a final recommendation. They are asked if they would recommend the implementation of a given ingredient in the cosmetics industry and, if yes, under which circumstances they would do so. During the presentation of the individual recommendations, the positions of the parallel groups covering identical ingredients are also compared and discussed.

Armed with their foreknowledge of positive and negative opinions of certain body cream components and a generic recipe for a body cream, the students are now able to produce their own product in a guided-inquiry experimental group activity (*active learning*). Each group must decide whether or not to use palm oil-based ingredients or parabens in their cream (silicones were not used in this recipe). They must also justify their decision. Their reasoning is presented to the other groups and then discussed (*assessment*). Each group is also required to create their own advertisement for their specific product (*active learning*). The pupils receive a worksheet giving preselected information about natural cosmetics. They need to sort the arguments into sets of positive and negative information, including scientific, technical and other sorts such as economic info (Belova and Eilks, 2014). Based on their analysis of the information the students create their own ads in small groups (*active and collaborative learning*). They must select the (potentially) most beneficial set of information to represent their product to a certain target audience (*cognitive advertising literacy*). This approach allows the learners win an overview of the various arguments available for natural cosmetics. During the presentation the students reflect upon which ads were the most convincing and why. They also discuss whether an inclusion of science-based information is reasonable when advertising for a specific target group and whether the case might be different for a different product or target group (*assessment*). (...)

After presenting their advertisements the students are given back their completed slogan rating worksheets from the beginning of the unit. They discuss whether their opinions and assessments have changed during the module and whether the correlations they discovered at the beginning of the module are still present. The claims from the initial exercise are rated again to see if their perceptions have changed (*assessment*).

An overview of the lesson plan structure is shown in Table 1. A connection is also made in Table 1 between the different activities and roles which advertising can play in the science classroom (roles 1 to 4, see above).

The lessons consist of four 45 minute classroom periods. The versions for different grade levels varied in the lengths of the texts covering the chemistry background.

Table 1 Structure of an advertisement-based module on natural cosmetics. Number of advertising scenario type refers to the outline in Section 2 of this paper

Phase and activity	Number of advertising scenario type
Activation of prior knowledge: the students rate the credibility of different claims such as 'Natural cosmetics are chemistry-free'. Such claims are most frequently used for advertising.	3
Reflection on authentic advertising slogans: the students receive a worksheet with ten authentic slogans, which must be rated regarding their attractiveness, scientific background, and credibility. Possible correlations between these three dimensions are also discussed.	3, 4
Introduction to the issue: the students are shown a collage with different labels and ads for natural cosmetics which are then discussed (also in relation to the previously shown claims).	1, 3
Introduction to subject matter learning: students work on worksheets presenting the components of a generic skin cream.	
Introduction to risk assessment: the students act as the employees of a fictional institute for risk assessment. They are supposed to formulate recommendations for different controversial cosmetic ingredients based on provided information.	
Creation of the students' own cream: in a guided inquiry-based scenario, the pupils prepare their own skin cream and decide whether or not to use various ingredients during its production.	2
Advertising the students' own product: the students receive a summary of positive and negative information about natural cosmetics. They have to select what they consider important and create an ad for their own product. They then present their ads and discuss whether or not they have actually used scientific information.	4
Meta-reflection: the students reflect on the worksheets with the slogan ratings from the beginning of the unit. The claims covered in the beginning exercise are rated again to see if and how pupils' perceptions have changed. The students discuss whether their assessment has changed during the module.	3, 4

Table 1. Structure of an advertisement-based module on natural cosmetics.

Role of teachers?

But what is the role of teachers within constructivism, a learning theory in which knowledge is the result of personal interpretations? Chrenka (2001, p.694) argues that “teachers who use a constructivist approach to learning are not invisible”. They are namely an integral part of students’ learning processes. According to constructivism, learning can be seen as an active, student-centred process. Nevertheless, learners need teachers’ help to select and transform information, construct hypotheses and make decisions. In other words, learning depends on teacher-scaffolded strategies (Chrenka, 2001).

Duffy and Cunningham (1996) also pointed out the importance of scaffolding that can be defined as given appropriate assistance allowing learners to engage in a practice or attain a goal otherwise out of reach (Davis & Miyake, 2004). The notion of scaffolding is in line with Vygotsky’s zone of proximal development in which individual support or scaffolding is provided until the learner appropriates the knowledge or skills. The support progressively decreases making the students more and more responsible, self-regulated and independent (Duffy and Cunningham, 1996). Davis and Miyake (2004) remark that the original notion of scaffolding refers to one-on-one tasks, but “How should scaffolding be provided for many learners at once (p. 267)?”. In classrooms, learners are namely working as a whole class as well as in pairs or small groups.

Role of the teacher in case study on advertising in chemistry education?

Belova and Eilks (2015) explain that the regular teacher accompanied the lesson, but it is not clearly stated what is meant by “accompanied”. It is possibly seen as a synonym for scaffolding. In addition, a classroom observation protocol is filled by the teacher.

Competencies of teachers in the context of advertising literacy?

UNESCO (2011) introduced a Media and Information Literacy Curriculum and Competency Framework for Teachers. It is - among others - developed for integration into the formal teacher education system, because enhancing Media and Information Literacy (MIL) among students requires that teachers themselves are media and information literate. The curriculum framework contains nine core modules that provide an outline of content and activities related to media and information literacy. This program can be adapted by teacher education institutions to different country contexts. One of the suggested modules focuses on advertising. Additionally, seven MIL competencies are pushed forward that emphasized specific knowledge, skills and attitudes that teachers should acquire. Sometimes a link to advertising is made. A few examples:

- **MIL Competency 2: Understanding media content and its uses (p. 31)**

The MIL teacher will be able to demonstrate knowledge and understanding of the ways people use media in their personal and public lives, the relationships among citizens and media content, as well as the use of media for a variety of purposes.

- Identify, analyse, and critique a variety of techniques used in advertising that are against international standards and codes of practice.

- **MIL Competency 4: Critically evaluating information and information sources (p.32)**

The MIL teacher will be able to critically evaluate information and its sources and to incorporate selected information for problem-solving and analysis of ideas.

- Use a variety of criteria (e.g. clarity, accuracy, effectiveness, bias, relevance of facts) to evaluate informational media (e.g. websites, documentaries, advertisements, news programmes)

INVOLVING PARENTS IN ADVERTISING LITERACY EDUCATION

Nation and colleagues (2003) indicated the importance of involving significant others in prevention programs. Involving parents is also pushed forward as design principle by Vanderhoven, Schellens and Valcke (2014c), who developed educational material about safety on social network sites. Below, we will shortly discuss previous research findings on the role of parents relating to children's exposure to advertisements.

To guide their children in a world full of advertisements, parents need insight into many new (online) advertising forms and techniques to be effective gatekeepers. Even parents who regularly use the internet for leisure and/or work ('digitally literate parents'), lack awareness of new advertising forms which results in an inability to protect their children or educate them about online commercial messages. For this reason, Cornish (2014) argues that

developing education programs to increase parents' advertising literacy is necessary, rather than merely focus on advertising literacy education for children.

Parents' advertising literacy?

To promote the (online) advertising literacy of parents, it might be interesting to create a website, a campaign, etc. with necessary background information in the field of advertising. Based on Vanderhoven, Schellens, Valcke and De Koning (2014), we conclude that an information evening for parents in their children's schools probably will not be effective. We will be looking for alternative ways to involve parents, like a homework task.

Most parents are not overly concerned about the influence of subtle (online) advertising forms and techniques on their children, but it is not advertising in general that leaves parents untroubled (Bijmolt, Claassen, & Brus, 1998; Cornish, 2014). For example, TV advertisements for (unhealthy) food causes parental concern (Bijmolt et al., 1998). Parents and their children often watch TV together allowing parents to have a clear picture of the commercial messages to which children are exposed, in contrast to online advertisements because most children explore the internet on their own (Cornish, 2014).

In response, parents use different strategies to their children's advertising exposure. On the one hand, some parents try to control their children's advertising viewing. This means, inter alia, that parents reduce the number of hours that their children watch TV and/or use the internet (Bijmolt et al., 1998), also named as *control style* (Buijzen, 2010) or *restrictive mediation* (Buijzen & Valkenburg, 2005). On the other hand, parents can apply a rather *communicative style* (Buijzen, 2010) or *active mediation* (Buijzen & Valkenburg, 2005). This implies that parents and children discuss advertising intent and content, that parents comment while watching ads, etc. (Bijmolt et al., 1998; Buijzen & Valkenburg, 2005; Buijzen, 2010). Research on parental mediation in the context of advertising is relatively scarce. The few studies moreover result in opposite conclusions (Bijmolt et al., 1998; Wiman, 1983), but active mediation or the communicative style is generally considered as the most effective (Buijzen & Valkenburg, 2005).

Involving parents in advertising literacy education?

Buijzen and Valkenburg (2005) remark that few studies have investigated the effectiveness of an educational intervention to improve the advertising literacy of minors. However, the role of parents is often omitted in these studies. In the AdLit project, we want to meet this shortcoming. Concretely, we can try to integrate active mediation in our educational packages, for example in a homework task that parents and children need to fulfil in collaboration (Vanderhoven, 2014). For primary education, *Stichting Media Rakkers* developed a game on advertising that parents and children can play together. The game exists of different parts, for instance, a memory game on brands or a game in which parents and children are asked to re-enact commercial messages. This game can result in a discussion about advertising.

CONCLUSION

By consulting literature on design-based research, we gain insight into principles - e.g. ongoing collaboration with practitioners, using mixed methods, conducting multiple iterations, etc. - which are important during the whole process of designing and implementing educational material aimed to instilling minors' advertising literacy. Next to these more general principles, we found nine principles of effective prevention programs (Nation et al., 2003) and learning principles belonging to constructivism. When designing and implementing educational material about advertisements, we need to keep all those principles in mind as much as possible. An overview of these three frameworks can be found in Table 2.

Design-based research	Principles of Nation et al. (2003)	Constructivism
<ul style="list-style-type: none"> • Departs from a problem 	<ul style="list-style-type: none"> • Comprehensive 	<ul style="list-style-type: none"> • Active learning
<ul style="list-style-type: none"> • Theoretical oriented 	<ul style="list-style-type: none"> • Varied teaching methods 	<ul style="list-style-type: none"> • Authentic learning
<ul style="list-style-type: none"> • Practical design guidelines 	<ul style="list-style-type: none"> • Sufficient dosage 	<ul style="list-style-type: none"> • Collaborative learning
<ul style="list-style-type: none"> • Research in real educational contexts 	<ul style="list-style-type: none"> • Theory driven 	<ul style="list-style-type: none"> • Assessment for learning
<ul style="list-style-type: none"> • Collaboration between researchers and practitioners 	<ul style="list-style-type: none"> • Positive relationships 	
<ul style="list-style-type: none"> • Design and testing of a significant intervention 	<ul style="list-style-type: none"> • Appropriately timed 	
<ul style="list-style-type: none"> • Multiple iterations 	<ul style="list-style-type: none"> • Socioculturally relevant 	
<ul style="list-style-type: none"> • Mixed methods 	<ul style="list-style-type: none"> • Outcome evaluation 	
	<ul style="list-style-type: none"> • Well-trained staff 	

Table 2. Overview Design-based research, Principles of Nation et al. (2003) and learning principles of constructivism.

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