



UvA-DARE (Digital Academic Repository)

Technology makes a difference : inclusiveness of technology in education

Heemskerk, I.M.C.C.

Publication date
2008

[Link to publication](#)

Citation for published version (APA):

Heemskerk, I. M. C. C. (2008). *Technology makes a difference : inclusiveness of technology in education*. [Thesis, fully internal, Universiteit van Amsterdam]. Universiteit van Amsterdam, Graduate School of Teaching and Learning.

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

Chapter 3

SOCIAL SCRIPTS IN EDUCATIONAL TECHNOLOGY AND INCLUSIVENESS IN CLASSROOM PRACTICE¹

Educational Information and Communication Technology (ICT) can be an appropriate tool for creating flexible learning environments. ICT can contribute to flexibility through its possibilities to keep content up-to-date and to address personal learning needs. ICT could, thus, make learning more accessible to a wider group of students. This requires that educational tools and the way they are used in the classroom, are experienced in a challenging and attractive way by a variety of students. In order to support the learning of all students, differences between students should be taken into account.

In this study, the concept of 'social scripts' is used for analyzing the inclusiveness of educational technology in four schools for secondary education in the Netherlands. It is also investigated how social scripts in educational tools and the inclusiveness of the use of these tools in classroom practice are related.

Our analysis shows that educational tools indeed differ in the extent of inclusiveness for different groups of students, particularly in their instructional structure. Teachers appeared to reinforce the inclusiveness of the more inclusive tools, but generally, did not affect the inclusiveness of the less inclusive tools. When more inclusive educational tools were used, all students participated more actively, they read the texts better, they asked fewer questions and they collaborated more. When working with the more inclusive tools, girls and minority students participated and collaborated more than when working with the less inclusive tools. Furthermore, the results suggest that students from minority groups need more help than majority population students, when using the less inclusive tools.

1. INTRODUCTION

Over the last decade, the use of technology in education has increased rapidly. For example, technology is used for monitoring student performances, and students communicate and collaborate with other students through the web. Educational technology can be an appropriate tool for creating flexible learning environments. ICT can contribute to flexibility through its possibilities to keep content up-to-date

¹ Heemskerck, I., Volman, M., Dam, G. ten, & Admiraal, W. (submitted). *Social scripts in educational technology and inclusiveness in classroom practice*.

and to address personal learning needs. ICT could, thus, make learning more accessible to a wider group of students.

However, there are indications that the use of educational technology in schools may work out differently for boys and girls, and for students with different socio-cultural backgrounds. Schools use ICT to a different extent and in different ways, and even within schools students have different possibilities to experience working with ICT (Schofield & Davidson, 2002; Solomon, 2002). These differences tend to be related to gender, and socio-cultural background of students. For example, there are indications that minority students in the Netherlands use educational technology at school more often in drill and practice applications, whereas Dutch majority students use more advanced educational tools and use the Internet more (Volman, Van Eck, Heemskerk & Kuiper, 2005). Moreover, the experiences of students working with a particular educational tool, are to a large extent determined by their experiences with ICT outside school, and their interests, attitudes and learning approaches, which may differ for boys and girls, and for students with different socio-cultural backgrounds (Chisholm, 1995; Damarin, 2000; Volman et al, 2005). Although ICT might be used to address the needs of students, students' appraisal of educational tools may also be different, and it may be related to gender and origin. In earlier studies we found, for example, that girls value clear instructions and an interesting subject more than boys, and minority students value pictures which provide additional information (Heemskerk, Volman, Admiraal & Ten Dam, submitted a). In other words, the use of technology in educational practice can be experienced differently by different groups of students and engage them differently. Educational tools may not necessarily be equally inclusive to different groups of students, which conflicts with the aim of equality in education. Teachers may deal with this in various ways.

In the literature on educational technology, it has been shown that teachers tend to adopt technology in ways that are consistent with their personal perspectives on curriculum and instructional practice (Niederhauser & Stoddart, 2001). This might also apply to the way they handle the inclusiveness of educational tools in the classroom.

In this study we focus on how the inclusiveness of educational technology is enacted by teachers in classroom practice and how this affects students. In order to understand the mechanisms of inclusiveness of educational tools, we use the concept of 'scripts' as introduced by Woolgar (1992).

2. SOCIAL SCRIPTS IN ICT

Scripts are assumptions about a supposed user which are 'built in' in the design of technology. These scripts, or 'user representations', may result in a design more suitable for a specific group of users and in the exclusion of other groups (Akrich, 1995; Rommes, 2002). On the other hand, users of technology do not necessarily need to adopt the scripts as constructed by the designers. Oudshoorn, Rommes, and Stienstra (2004), describe how in processes of 'domestication' new meanings can be created or how new usage of objects can be created. Finally, users can become non-users. These processes are situated in a cultural context, in which cultural codes are important. For example, gender codes play an important role in processes of domes-

tication of the Internet (Van Zoonen, 2002). In an educational context, teachers play a role in modification of scripts, while they coach their students in the use of the application, and they can choose whether they use the application in their classes or not. Modifications of scripts initiated by students may be difficult. Students are supposed to use the selected tools, and they are supposed to use it in a way which is limited by the boundaries teachers offer. Using technology which is not suitable for students may lead to a loss of their involvement and engagement. In the end, this can result in differences in participation, attitudes and learning outcomes (Van Eck & Volman, 1999). Oudshoorn, Saetnan, and Lie (2002) elaborated the concept of scripts as 'gender scripts', indicating inscriptions and de-inscriptions of representations of masculinities and femininities in technological products. In this research, we elaborated the concept of scripts as 'social scripts'. Social scripts refer to scripts which may be related to gender differences as well as socio-cultural differences between students.

Social scripts in educational tools can be traced on the basis of literature on socio-cultural sensitivity and gender-inclusiveness in educational software. We distinguish three aspects of possible social scripts in educational software: scripts in the content of educational technology, scripts in the visual and audio interface, and scripts in the instructional structure of the technological tool (see Heemskerk, Brink, Volman, & Ten Dam, 2005 for a review study). Students should be offered possibilities to identify with the subject matter and the way it is presented, and each student should feel both comfortable and challenged when working with the tool. Therefore, the structure of the program and the kind of learning processes that are facilitated by it, must fit in with the ability level and learning approaches of different groups of students. For the three aspects of scripts, questions can be articulated to indicate whether social scripts are hidden in particular educational tools, causing less inclusiveness for students with different socio-cultural background and gender. These questions have been worked out as an index of inclusiveness (see Table 1).

*Table 1**Index of inclusiveness***1. Content****1.1 Perspective**

- | | |
|------------------------------|---|
| Presence of different groups | <ul style="list-style-type: none"> • Is there a balanced representation of diverse human groups (e.g. male/female; different cultural backgrounds, diversity of ethnicity/race; different social classes; urban/rural; diversity of religions/beliefs)? |
| Representation of groups | <ul style="list-style-type: none"> • Are the groups presented in ways that are positive, equal and non-stereotypical (e.g. variety of living situations, variety of occupational tasks and other activities, variety in human responses, aggressive as well as sensitive, active as well as inactive)? |
| Contributions of groups | <ul style="list-style-type: none"> • Are the groups represented in ways that reflect accurately their potential contributions to the subject of the program? • Are issues relating to groups routinely included within the content as opposed to being separated out as ‘special concerns’? • Does the content avoid assuming that all people are operating from the same group, perspective and/or values? • Is it clear that decisions made in simulations may have different effects for different groups? |

1.2 Respectful of values

- Is the content respectful and considerate of the values, manners and taboos of the different cultural groups?
- Is the language free of biased terminology?

1.3 Real-life context

- Is the subject matter presented in an authentic context (e.g. by using the experiences of the students, actively involve the students in problem solving, addressing the usefulness of the subject in daily life, presenting a subject using different disciplines)?

1.4 Addressing**different interests**

- Does the material have the potential to attract the interest of all groups, not just represents a stereotype of the interest of one group?

2. Interface

2.1 Visual aspects

- | | |
|---|---|
| Presence and representation of different groups | <ul style="list-style-type: none"> • Is there a balanced representation of diverse human groups (e.g. male/female; different cultural backgrounds, diversity of ethnicity/race; different social classes; urban/rural; diversity of religions/beliefs)? • Are the groups presented in ways that are positive, equal and non-stereotypical (e.g. variety of living situations, variety of occupational tasks and other activities, variety in human responses, aggressive as well as sensitive, active as well as inactive)? |
| Respectful of values | <ul style="list-style-type: none"> • Is the visual interface respectful and considerate of the values, manners and taboos of the different cultural groups (e.g. in the use of colour, icons, pictures of animals and other images)? |
| Preferences of different groups | <ul style="list-style-type: none"> • Are the preferences of different groups taken into account in the visual interface (e.g. bright vs dark colours, detailed or not, clarity of images)? |
| Packaging | <ul style="list-style-type: none"> • Do the packaging and/or advertising show a diversity of groups rather than one group to the exclusion of others? |

2.2 Audio aspects

- | | |
|------------------|---|
| Voice | <ul style="list-style-type: none"> • Does audio material include narrators from a range of group voices? |
| Music and sounds | <ul style="list-style-type: none"> • Does the sound track include a variety of styles of music/sounds? |

3. Instructional structure

3.1 Prior knowledge

- | | |
|---------------|--|
| Initial level | <ul style="list-style-type: none"> • Is the material designed effectively and explained thoroughly enough so that all users can work with it, regardless of differences in <ul style="list-style-type: none"> • ICT skills and knowledge • Content knowledge and learning capabilities |
|---------------|--|

Home language	<ul style="list-style-type: none"> • Does the material acknowledge that learners may have a variety of home languages and take that into account (e.g. by using dictionaries, the use of clear language, multilingual)?
3.2 Learning strategies	<ul style="list-style-type: none"> • Does the material acknowledge that learners may have a variety of learning strategies and take that into account
3.3 Learning activities	
Collaboration	<ul style="list-style-type: none"> • Does the program accommodate learning together as opposed to competition? <p>If working in groups is required does the program:</p> <ul style="list-style-type: none"> • Accommodate multiple roles and tasks • Provide all students with the opportunity to do different tasks and practice different roles
Communication	<ul style="list-style-type: none"> • Does the program accommodate ways of communication with other people, e.g. experts, students? <p>If communication is required does the program:</p> <ul style="list-style-type: none"> • Acknowledge that some students may have difficulty with asking (why-) questions, arguing with adults or formulating their ideas? • Acknowledge that differences in communication styles exist between different groups or different languages (e.g. differences may occur in frequency, length or tone of messages)?
Skills	<ul style="list-style-type: none"> • Are different kinds of skills addressed (e.g. writing, drawing)?
3.4 Help	
Scaffolding	<ul style="list-style-type: none"> • Does the program offer scaffolding support, i.e. an apprenticeship approach helping the student to develop the necessary skills?
Feedback	<ul style="list-style-type: none"> • Is the feedback to the student positive and direct?
Self-esteem	<ul style="list-style-type: none"> • Does the program offer support in a way that promotes the self-esteem of the student? • Does the program offer ways for students to function as teacher or expert to other students?
3.5 Students input	
Choice	<ul style="list-style-type: none"> • Does the program offer possibilities for students to have choice in how to work (e.g. are there different ways to use the program, different solutions to the assignments)? • Is the student treated as an active participant with responsibility for their learning process?

Flexibility	<ul style="list-style-type: none"> • Is the program made in such a flexible manner that students can alter parts to their preference? • Can students add their own information and experiences into the material?
-------------	---

(Heemskerk et al., 2005)

Regarding the *content* of educational tools, many authors have argued that there must be no obstacles to students giving personal meaning to the subject matter. They claim that this can be achieved by taking a perspective that is multicultural, non-sexist and respectful of different social classes (Adler, 1999; Gillani, 2000; Larson, 1999; Roblyer, Dozier-Henry & Burnette, 1996; Wang & Reeves, 2007). This implies that the content is considerate of the values, manners and taboos of different cultural groups, for example, avoidance of sexist or racist language (Lu, Walker & Huang, 1999). More specifically, the literature on gender-inclusive education has pointed out the importance of presenting the subject matter in a 'real-life' context (Agosto, 2001; Volman, 1997). Female students tend to be more interested in school subjects when they are dealt with in the context of their practical and social applications. A final issue regarding the content of educational tools is the importance of creating applications that address students' different interests (Joiner, Messer, Littleton & Light, 1996).

Discussions on the characteristics of an inclusive *visual interface* in educational technology largely address similar issues as those concerning the content. Questions which can be asked are: 'Do the illustrations and graphics of the program represent a diversity of groups of people?', 'Are these groups represented in a non-stereotypical way?', 'Are cultural values, customs and taboos treated with respect?', 'Are the preferences of different groups taken into account in the visual interface?', and 'Do the packaging and advertising show a diversity of groups rather than one group to the exclusion of others?' Regarding the *audio* aspects of educational technology, it is important to include narrators from different backgrounds and a variety of styles of music and sounds (Fiore, 1999; Gillani, 2000; Royer, Greene & Anzalone, 1994). The use of diverse visual and audio features in educational tools can make these tools more attractive to a wide range of students.

Several issues can be subsumed under the heading 'inclusiveness of the *instructional structure* of an application'. These relate to whether the way the learning process is structured or facilitated by the tool is compatible with the ability levels and learning approaches of different groups of students. Firstly, the instructional structure of an educational tool should be based on the prior knowledge of different groups of students. This refers to the initial levels of both computer skills and knowledge of the subject matter in question (Novak & Hoffman, 1998; Volman & Vfan Eck, 2001). Moreover, prior knowledge also refers to students' language skills, which can be especially influential if students' home language differs from the instructional language of the program/tool. Not only the technical-language skills but

also the cultural codes of students can be an obstacle to working effectively with a specific program, for example when texts in the tool are too direct or offensive in their culture. (Ikegulu, 1997; Joo, 1999). The second issue is the cultural differences in learning strategies. Many authors claim that programs should accommodate students' preferred learning strategies, which may be related to their gender and/or cultural background (Freedman & Liu, 1996; Ikegulu, 1997; Irwin, Moore & Stevenson, 1994; McLoughlin, 1999). For example, researchers argue that a lot of educational software is unintentionally tailored to a Western approach to learning based on the Anglo-Saxon cultural values of independence and self-reliance in learning (cf. Chisholm, 1995). This does not match with, for example, the Mexican-American and African-American values of cooperation and interdependence (cf. Adler, 1999). A related issue concerns the critical attitude towards teachers and knowledge, which is generally considered to be typically Western (Henderson, 1996; Wang & Reeves, 2007). The third issue regarding the instructional structure of educational tools is the kind of learning activities that are addressed in a software program or tool; the issue of social interaction is considered to be particularly relevant. Preferences for collaboration or competition in general, and for applications facilitating communication in particular have been found to be related to socio-cultural background and gender. For instance, research on gender reveals that girls prefer collaboration to competition (Agosto, 2001; De Jean, Uptis, Koch & Young, 1999; Fiore, 1999; Selby & Ryba, 1994). The fourth aspect of the instructional structure of educational tools that is relevant to inclusiveness is the opportunity for students to receive help. Many authors mention the importance of clear and immediate feedback and scaffolds (Gillani, 2000; Selby & Ryba, 1994), which are particularly important for students lacking self-confidence (Agosto, 2001). The fifth issue that is supposed to affect the inclusiveness of educational tools is the extent to which students are allowed to make their own input or take responsibility when working with the educational tool (e.g. DeVogd, 1998; Maurer & Davidson, 1999).

In the present study, we distinguish between inclusiveness on the formal curriculum level and on the operational level. The former refers to the design of learner materials. The latter refers to the classroom behaviours of teachers and students (cf., Goodlad, Klein, & Tye, 1979). The problem we want to address in this study is how social scripts in educational tools are related to inclusiveness in classroom practice. First, we investigate what social scripts are inscribed in the design of educational tools. Second, we examine if and how teachers and students modify the inclusiveness of the tools, while they use them in the classroom. The main research question is: How are the social scripts in inclusive and non-inclusive tools enacted in classroom practice in terms of teacher and student behaviour?

3. METHODS

3.1. Participants

The participants of this study are 81 9th grade students (age 14-15) in four schools for secondary education. The schools were selected according to the following criteria:

- A diverse student population in terms of gender, socio-economical background and cultural background.
- 13-50% of the students are from ethnic minorities, according to the CFI² instruction.
- Innovators in the area of the implementation of ICT.

The selected schools are situated in two large cities and a small town in the Netherlands. They varied in size and denomination. All schools mentioned the implementation of ICT in education as an important goal. They worked with laptop classes or an ICT-learning line, and provided an electronic learning environment.

In these schools, four lessons of one group of students have been observed; two lessons of two different courses in which educational tools have been used. In total 7 educational tools have been examined. The teachers were experienced in their subject and in the use of ICT. Table 2 shows the distribution of students over schools and observed courses, as well as student characteristics.

Table 2

Percentage and characteristics of students in participating schools and observed courses.

Students in %	School A N=13	School B N=21	School C N=27	School D N=20
Courses	German History	English Geography	German Geography	French History
Gender				
<i>Girls</i>	53.8	54.5	63.0	60.0
<i>Boys</i>	46.2	45.5	37.0	40.0
Origin				
<i>Minority</i>	15.4	23.8	59.3	90.0
<i>Majority</i>	84.6	76.2	40.7	10.0

² CFI is an organization responsible for financing educational institutions and disseminating government information on education in the Netherlands.

3.2. Data

In this study, two levels of curriculum are studied. The formal curriculum level was examined by two researchers who scored the tools independently on the degree of inclusiveness.

The operational curriculum level was examined by means of observations of teachers and students during the use of ICT in the classroom. The observations were performed in teams of two researchers. Video- and audio records were supplemented by the field notes of the observations (Adler & Adler, 1994). In each class, four students were selected for observation forming a mixture of boys and girls, and students of different origin. In each school, the ICT coordinator has been interviewed about the school policy and the implementation of ICT. The interviews and observations were transcribed into protocols and analyzed with help of Kwalitan software for qualitative analysis (www.kwalitan.nl).

3.3. Instruments and analysis

Two variables were measured. First, at the level of the formal curriculum, the presence of social scripts in seven educational tools has been measured, using an operationalization of the index of inclusiveness (see Table 1).

Each subheading (1.1, 1.2, 1.3 etc.) was scored by two researchers, with the help of questions focusing on whether attention in the tool was paid to that particular theme, for example: 'Is there a balanced representation of diverse human groups?' (with 0= no or little attention, and 1=clear attention). For the cluster 'content' and 'interface', a separate score has been calculated for boys and girls, for students with different socio-economical backgrounds (SES), and for students with different ethnic backgrounds (origin). For the cluster 'instruction' only one score has been assigned for each item. We checked whether the instruction accommodated *different* ways of learning and working with the tool, instead of specifying ways of instruction that would fit particular social groups. The scores on the clusters Content (with a range of 0-4), Interface (0-2), Instruction (0-5) were summed (0-11). This resulted into three scores for each of the seven tools, one for gender inclusiveness, one for inclusiveness of origin, and one for socio-economical background. The inter-observer agreement between the two observers is 0.85 in terms of Cohen's kappa.

Secondly, at the level of the operational curriculum, we measured the inclusiveness of the use of educational tools in classroom practice with the help of two observation instruments. The first instrument is focused on the observation of teaching behaviour in terms of the index of inclusiveness. In addition, some general items about the use of ICT and about the classroom practice were included, such as the quality and quantity of computers, collaboration or competition, and participation of students. The second instrument is focused on the observation of student behaviour, again in terms of the index of inclusiveness. Now the items focus on how and to what extent students participate and what roles and approaches appear while they work with different tools, such as collaboration and communication.

The video tapes and researcher's notes of the observations were transcribed in written protocols. From these protocols, assertions and descriptions were selected

which were related to each item of the index of inclusiveness. For teacher behaviour, this process resulted in summaries and reflections on inclusive or non-inclusive teacher behaviour, in relation to the scripts in the applied tool. Four observers analyzed these data from scratch, in terms of whether the teacher reinforced or diminished the inclusiveness of the tool, and negotiated disagreements until the outcomes were agreed upon or disagreements were understood and reflected as such (cf. Marble 1997). The analysis resulted in positive or negative marks on each item of the index of inclusiveness, for teachers who respectively reinforced or diminished the inclusiveness of the tool. Finally, the marks in the more and less inclusive tools were summed separately.

The analysis of the student observations followed the process of content analysis according to Huberman and Miles (2002). In the analysis of the observations of how students work with educational technology in the classroom, two topics were distinguished, namely, participation, and role and approach. Participation was operationalized in terms of concentration and active involvement or distraction of students; and role and approach in terms of cooperation, communication and the way students' use their skills such as reading or typing texts. With regard to the topic 'participation', we considered how much time students were working concentrated and actively involved during the observation intervals, and the duration and amount of times of distraction from their work. We looked whether students were working on the task, or whether they were chatting or Googling off-task. Regarding 'role and approach', we considered whether students deliberated or cooperated on the task, or whether they were talking with their peers off-task. This information provided insight in the extent of students' participation and their role and approach while working with the educational tools. After the process of data reduction described above, namely selecting assertions and descriptions from the transcribed protocols, the relevant fragments were sorted into appearance related to gender and cultural background of students, and related to whether less inclusive or more inclusive tools were used (data matrix). In the third phase (conclusion drawing and verification) conclusions were drawn on whether student behaviour was different in more or less inclusive tools, and whether differences between boys and girls, and between minority and majority students appeared. These conclusions were verified by going through the data again and looking for counterexamples.

4. RESULTS

In this results section, we will go into the two levels of how inclusiveness of ICT might work out in the educational practice. We will first describe the formal curriculum level, which addresses the social scripts which has been built in the educational tools of this study. Then, we will elaborate on two aspects of the operational level: teacher behaviour and student behaviour. For teacher behaviour, two types of teaching will be described: teaching activities that reinforce the inclusiveness and teaching that diminishes the inclusiveness as defined by the social scripts in the educational tool used. For student behaviour, the student activities are described for different groups of students. Firstly, girls and boys were distinguished. Secondly, stu-

dents originating from a minority population and students from the majority population were distinguished.

4.1. Formal curriculum level

4.1.1. General description

In this study seven applications are selected, three applications for a language course (English, German and French) and four for social studies (History and Geography, each two applications). The German and French applications belong to schoolbooks which are used in the course. They are designed by a publishing-firm and available via the internet and/or CD-rom. These applications have the same look-and-feel as the textbook and correspond with the contents of the regular lessons, which in general is repeated and exercised in the educational tool. The other applications are designed by the teachers themselves and generally consist of assignments and searching for information.

Although ICT is not the most suitable medium for supplying linear narrative (Laurillard, 2002), all analysed educational tools trigger linear student activities to some extent. Students can read information, in various amounts supplemented by photos, drawings or short films. The tools for German and French offer relatively little linear narrative material, while the two tools for geography present a relatively large amount. All tools facilitate exploration. Students can navigate through the application, use hyperlinks, use different sources from the internet etc. Four applications might be classified as more advanced educational tools. In the two tools belonging to the regular schoolbooks (German and French) students can play an educational game or they can use city cameras by the Internet, and in these tools feedback is provided. The other two more advanced tools are both history tools, in which students can produce a power point presentation or a chapter of a book, or they have to work in groups and research sources for a debate.

4.1.2 Social scripts

Besides general differences, the applications differ with regard to the extent of inclusiveness for different groups of students. What are the social scripts appearing from the analysis of the tools at the level of the formal curriculum according to the index of inclusiveness? In Table 3, we summarized the frequency of the appearance of elements of the index of inclusiveness in the tools, separately in the three clusters of the index (content, interface and instructional structure). In general, the instructional structure of the educational tools appears to be the most distinguishing aspect in relation to inclusiveness.

Table 3

Inclusiveness of the social scripts of the educational tools

Application	Content (range 0-4)	Interface (range 0-2)	Instruction (range 0-5)	Total (range 0-11)
Tool 1 Geography (B)				
SES	1	0		1
Gender	1	0	0	1
Origin	1	0		1
Tool 2 Geography (C)				
SES	1	0		1
Gender	1	0	0	1
Origin	1	0		1
Tool 3 English (B)				
SES	1	0		1
Gender	1	1	0	2
Origin	1	0		1
Tool 4 German (A, C)				
SES	0	1		2
Gender	3	1	1	5
Origin	0	1		2
Tool 5 History (A)				
SES	4	1		7
Gender	4	1	2	7
Origin	3	0		5
Tool 6 History (D)				
SES	2	0		6
Gender	3	1	4	8
Origin	2	0		6
Tool 7 French (D)				
SES	0	1		6
Gender	3	2	5	10
Origin	0	0		5

The inclusiveness of the *content* of educational tools is primarily determined by items which address different interests of students and put the subject matter in a real-life context. Tools 1, 2 and 3 score equally low for gender, SES and origin. In tools 4 and 7 attention is paid to inclusiveness with regard to gender, but not to stu-

dents from different origin. Tools 5 and 6 are the most inclusive to all categories of students when content is concerned.

The scores of inclusiveness for *interface* are generally low as most tools do not include pictures or video. The material often consists of text only. When little visual material is used, it's hard to present different perspectives and/or a balance of different groups of students. Audio aspects are even less used, with the exception of tools 4 and 7, where foreign languages are spoken. Tools 1 and 2 have a zero score on this point. Tool 7 shows the highest score, because it shows the best balance in presentation of different categories in pictures and sounds.

The items concerning the *instructional structure* relate to whether the way the learning process is structured or facilitated by the tool is compatible with the ability levels and learning approaches of different categories of students. In the less inclusive tools (1,2 and 3) we find a zero score for all items mentioned. This means that all students are supposed to work in the same way, namely individually reading texts and answering questions. They have to work at the same level of difficulty concerning ICT skills as well as concerning the content and level of language achievement, without support, scaffolding or help functions. The more inclusive tools are more compatible to different ability levels and learning approaches, different skills are addressed, collaboration is accommodated, students receive good support and they can put in their own experiences or information and they have responsibility for their learning process. The most inclusive tools, tools 6 and 7, provide, for example, different ability levels, or offer a glossary. As to learning approaches, students can choose the order of learning and between listening or reading texts, etc. Students can choose whether and how they want to cooperate. The tool provides help functions or students can choose their own solution. They are facilitated to plan their work and choose which material they want to use.

From the analysis of the formal curriculum level it appeared that in all applications gender diversity is taken into account most, while diversity in terms of socio-economic background and origin were paid less attention to. Overall the inclusiveness for the three different categories are correlated, which means that the tools that are more inclusive in terms of gender are more inclusive in terms of origin and socio-economic background as well. Tools 5, 6 and 7 can be considered the most inclusive from the seven analysed tools. These are the two history applications and the French application. The two geography applications and the English application appeared to be the least inclusive tools (1, 2 and 3). The tools belonging to school-books (4 and 7) which are provided by a publisher, scored relatively high on the aspect of the interface.

Comparing these results with the general description of educational tools earlier in this section, we see that the tools which are the least inclusive (1, 2 and 3) are mainly narrative and facilitate exploration. The more inclusive tools are the more advanced tools which facilitate more learning activities, and show a less linear structure.

4.2. Operational curriculum level

At the operational curriculum level, we distinguish between teacher behaviour and student activities. We will compare the use of three applications which are more inclusive (tools 5, 6 and 7) at the formal curriculum level with three applications which are less inclusive (tools 1, 2 and 3).

Before answering the question into the extent of inclusiveness it is useful to point out some contextual observations. In general, only little technical problems occurred while working with the educational tools. The teachers appeared to be capable to solve the problems that did occur, like printers that did not work, headsets which were defect, sites that were occupied etc. They helped students to fix the problems or they solved the problem in a flexible way like the suggestion to mail the answers instead of printing them. Overall the atmosphere in the classes was not competitive and the participation of students was good.

4.2.1. Teacher behaviour

In this section, two types of teacher behaviour will be described: teaching that reinforces or diminishes inclusiveness, both for the three less inclusive tools and the three more inclusive tools. The inclusiveness of teacher behaviour is reported for all groups of students, without differentiation between girls and boys, students from minority groups or from majority groups, and students from different socio-economical backgrounds, since teacher behaviour is not always directed at specific students. The appearance of inclusiveness reinforcing or diminishing behaviours is summarized in Table 4. Each mark represents the number of teachers showing behaviour related to the inclusiveness of the tools on the various aspects of the index of inclusiveness. Positive or negative marks indicate whether inclusiveness was reinforced or diminished. Finally, the marks in the more and less inclusive tools were summed separately.

In general, we find the most inclusiveness stimulating teacher actions, and the least inclusiveness diminishing teacher actions in the cases where already more inclusive tools are used. These differences between more and less inclusive tools are most prominent in teacher behaviour with regard to prior knowledge, students learning activities and providing help, except for the aspects of prior ICT knowledge and scaffolding. This will be explained below.

Table 4

Scores on teacher behaviour in relation to the index of inclusiveness. (Range 0-3, indicating the number of teachers showing the specified type of behaviour.)

Item of the index		Less inclusive tools		More inclusive tools	
		Further diminishing inclusiveness	Reinforcing inclusiveness	Diminishing inclusiveness	Further reinforcing inclusiveness
Content	Perspective				
	Respectful of values				+1
	Real-life context		+1		+1
	Addressing different interests				+2
Interface	Visual aspects			-1	
	Audio aspects				
Instruction	Prior knowledge, <i>ICT</i>		+3	-1	+1
	<i>Content</i>	-2	+1		+3
	Learning strategies	-2			+2
	Learning activities				
	<i>Cooperation</i>				+2
	<i>Communication</i>	-1	+1		+3
	<i>Skills</i>				+2
	Help				
	<i>Scaffolding</i>		+2		
	<i>Feed back</i>	-1	+1	-1	+2
<i>Self-esteem</i>	-2	+1	-1	+2	
	Students input; choice and flexibility				+2
		-8	+10	-4	+23

Teaching reinforcing inclusiveness

As to the *content*, only a few inclusiveness stimulating teacher actions were observed. For example, in a more inclusive tool the aspect of 'respectful of values' was improved by discussion between the teacher and a student. In this case the teacher discussed prejudices against Jewish people and explained the difference between facts and prejudices. The aspect of real-life context in tools was made more inclusive by connecting experiences of students to the content. For example, one tool dealt with public water cleaning and sewerage. The teacher organized a visit with the students to a sewage treatment plant. The aspect of 'addressing different interests' of a tool has been reinforced by following the interests of students. For example, students had to choose a subject from a list of subjects on which they had to prepare a presentation. In another example, a student is interested in a specific source of information about the Holocaust, and brings up an interesting question.

The teacher stimulates this student to do further research on this and to report the results.

There were no teacher actions observed which reinforced the inclusiveness of the *interface*.

More ways of reinforcing inclusiveness were observed with respect to the cluster of *instruction*. With respect to the aspect of 'prior knowledge' teachers generally refer to previous lessons or other material which is used earlier in the course, or they give additional instructions in order to make students find their way on the computer. For example, students get a note with instructions on how to start the task on the computer, and a teacher explains the easiest way to save the answers and how to manage documents in web mail. In another case, students use the tool for their preparation of an exam. They have to choose tasks they find difficult and have the opportunity to ask questions.

With respect to the aspect of adaptation to different learning strategies, improvements to the inclusiveness of the tools were observed when teachers give students a choice in how to work. For example, students are allowed to collaborate in a problem-solving task, or to cooperate by dividing the tasks. Another example is that students are allowed to choose whether they want to work with the schoolbook or with the tool, and they are allowed to choose which tasks they want to complete.

Reinforcing the inclusiveness of educational tools in the sense of using of a variety of learning activities, teachers add to the inclusiveness of tools on all three aspects mentioned in the index: cooperation, communication and skills. With respect to cooperation, students are supported and coached. For example, while students cooperate in small groups, one of the students is accused of being lazy by the other members of the group. The teacher sorts this out and helps the students to get along. With respect to communication, inclusiveness is reinforced by teachers who are available for students to ask questions, and who pay attention to students who don't ask questions. For example, a teacher emphasizes to be available for answering questions and discussion. Teachers walk around in the classroom answering questions and paying attention to individual students by asking them how they are doing. With respect to skills, inclusiveness is improved by helping students to develop their skills to cooperate, for example by advising them to take turns on the tasks.

Another way of how teachers reinforce the inclusiveness of a tool is by offering help through scaffolding, positive and direct feedback, and enhancing students' self-esteem. Teachers give students hints or ask questions in order to help students to find the answers to the task. For example, a teacher tells students that they ask good questions, or tells them the answer is correct but that they should elaborate a bit more. Some teachers give students the opportunity to explore the tool and to share their discoveries with other students.

Finally, with respect to the aspect of students' input, the inclusiveness of a tool is improved by giving students responsibility for their learning process and the opportunity to add their own information and experiences. For example, students can choose which tasks they want to do in order to prepare for an exam. Students have to plan their actions, and the teacher gives individual advice about the planning. Students sometimes have to negotiate with other members of the group, or with students

from other groups, in order to choose the subject of their task. In another example, students are offered an ill-structured task, in which they are free to bring up different subjects and to prepare a presentation the way they like.

Teaching diminishing inclusiveness

In general, we found less teacher activities which could be interpreted as diminishing the inclusiveness of a tool. With respect to the *content* of a tool, no activities were observed. In the cluster of *the interface* we found just one diminishing action on the features of the tools. In this action, the teacher discourages some students to put effort in the design of a PowerPoint presentation.

We only observed a few teacher actions which might be interpreted as diminishing the inclusiveness of a tool in the cluster of *instruction*. In an example with respect to prior knowledge, students showed to have difficulties with a task. The teacher answered the questions directly without referring to prior knowledge. In another example, students had some difficulties with starting the application. The boys neglected the instructions of the teacher, and found out for themselves how to start the program. The girls waited for the help of the teacher. The teacher did not provide any instructions or refer to prior knowledge, but personally undertook the necessary actions on the computer. Yet in another example, the content appeared to be more difficult than the teacher expected. Help was provided individually and students had to wait for a long time before they could ask their questions. In these cases, reminders referring to prior knowledge of the content could have been offered in groups or in the class as a whole, to prevent students losing their interest.

In two examples, students were expected to work individually on their tasks, and other learning strategies were not addressed, whereas the tools could have been used in other ways.

An example of diminishing inclusiveness with respect to learning activities was found in the aspect of communication. Communication with the teacher is sometimes hindered, because the teacher withdraws behind a computer and is not available for questions during a substantial period of the lesson.

In the aspect of providing help some examples of diminishing the inclusiveness of the tools were observed. Teacher feedback is sometimes negative and indirect. For example, a teacher says: "It's often too difficult for you, isn't it?" or "Do you still not know it?"

In another example, a student has to skip the task which she could not complete without receiving any help. Promoting self-esteem when it comes to ICT skills or knowledge is in two examples restricted to boys. One example concerns some teachers who talk with boys only about technical aspects of computers (e.g., USB sticks and fire-wire, the failing start-up of a CD-rom.). In another case, self-esteem of students is hindered by a teacher who gets irritated when students have problems with asking questions: "You are not working very well, and I don't hear questions!"

To summarize, teachers hardly modify the scripts of the educational tools. Teachers' actions, while less inclusive tools are used in the classroom, are equally often moderating or reinforcing inclusiveness. On the contrary, teachers' behaviour reinforces

the inclusiveness of the already more inclusive tools. These results show that the categorization of the educational tools at the formal curriculum level in terms of inclusiveness, needs no re-adjustment with regard to the operational curriculum level.

4.2.2. *Students' classroom activities*

In the analysis of the observations of how students work with ICT in the classroom, we distinguish two topics: participation, and role and approach. These topics were observed on student level, and on classroom level in order to have a general view on all students. On each topic we will discuss differences between student categories when working with less inclusive and more inclusive tools.

Participation

Classroom observations show, that students were generally really concentrated and seriously working with the applications. Nevertheless, in the lessons with less inclusive tools participation seems to be less, for example students are chatting on line (MSN), talking more loudly or asking irrelevant questions.

This general observation is confirmed by student observations (see table 5). In the lessons where more inclusive tools are used, participation is better. This result concerns girls and students from minority groups more than boys and students from the majority of the population.

Table 5
Student behaviour; Participation

Girls	
Minority	Majority
<i>Less inclusive tools</i>	<i>Less inclusive tools</i>
<ul style="list-style-type: none"> • Not concentrated. Talks with other students, calls for help quickly and is easy to get distracted, for example, by chat sites of other students. • Half of the observed time working secretly on another course. The other part of the time she is working rather well, distracted only for a short while. • Messy start; mails answers to another student which is not the intention of the course. Afterwards rather good work. Once get distracted shortly by another student. 	<ul style="list-style-type: none"> • Works hard and concentrated. Gets distracted shortly a few times by other students. • At first busy with something else than the task. Afterwards working hard and concentrated. Few short breaks (gazing out of the window and talking to another student.) • Arrives a few minutes late. Works rather concentrated and diligent on the task, but part of the time busy with another site which doesn't deal with the task.

Boys	
Minority	Majority
<p><i>More inclusive tools</i></p> <ul style="list-style-type: none"> • Works hard on the task in cooperation with the neighbour. • Works nearly the whole lesson actively on the task. Some short interruptions by the neighbour. • Works actively and concentrated on the task, together with the neighbour. One time talking shortly about something else. • Works the whole lesson well and concentrated on the task. Gets distracted once by the neighbour about a test. 	<p><i>More inclusive tools</i></p> <ul style="list-style-type: none"> • Works hard and concentrated during the whole lesson. Sometimes consults neighbour on the task. • Works involved on the task. Sometimes consults other girls on the task.
<p><i>Less inclusive tools</i></p> <ul style="list-style-type: none"> • Works concentrated and actively on the task. Gets distracted several times by other students. 	<p><i>Less inclusive tools</i></p> <ul style="list-style-type: none"> • Works hard and concentrated. Talks with neighbour about the task and listens to the explanation of the teacher to the neighbour. • Works for the whole observation period hard. Consult the neighbour one time, and one time gets distracted by another teacher. • About half of the observed time quite active, but clearly has to make an effort to concentrate. Walks away from the computer to have a look somewhere else, or gets distracted by other matters and tries to find out if the teacher catches him working with Google, which is not part of the task. • Works well on the task. One short distraction by another student who is talking to the teacher. • Works hard on the task, together with another student.

More inclusive tools

- Works hard and with good concentration on the PowerPoint presentation. Cooperating with another boy.
- Works concentrated and actively during the lesson.
- Works actively on the task. Discusses the content with the teacher.
- Not very active in doing the task. Consults a few times other group members on the task. Teacher involvement about the task division.
- Works actively and concentrated on the task. Discussion with teacher about time-schedule.

More inclusive tools

- Works most of the time well on the task. Partly listening inattentive to other students or the teacher, or leaning backward yawning.

Role and approach

The less inclusive tools are designed in a way that students have to read large portions of text in order to find the answers to the questions of their tasks. In the more inclusive tools students have to read less text and they have more possibilities to cooperate and to be responsible for the planning and performance of the tasks. None of the applications specifically accommodates competition.

Classroom observations show that the atmosphere in the classes was generally cooperative and not competitive. Only one teacher tries to stimulate some competition, by rewarding the best presentation by putting it on the school website. Student and classroom observations show some differences in student classroom activities between the less and more inclusive tools. The more inclusive tools seem to invite students to work in consultancy with their peers and to cooperate with each other. However, different responses between groups of students are found. Girls and students originating from minority groups use the opportunity to cooperate more often than boys and students from the majority of the population.

As might be expected from the design of the tools, classroom observations show that students working with less inclusive tools, indeed, mostly work individually and consult each other only when necessary. Students using the more inclusive tools are working more cooperatively. Boys and girls generally appear to differ in the aspect of cooperation and communication; girls have more interaction with their peers than boys do.

Individual observations of students (see Table 6) establish this view. While working with less inclusive tools more students work individually, even without asking help from their peers, and while with more inclusive tools, indeed, more students work cooperatively and less students work strictly individual. The individual observations show not only differences between boys and girls, but differences between minority students and students from the majority of the population as well. Girls and students originating from minority groups cooperate more often while they

are working with the more inclusive tools, than while they are working with the less inclusive tools. On the contrary, boys and students from the majority of the population do not differ much in their way of working when both type of tools are compared; they work mostly individually.

We also find differences between the tools with respect to students' need for help. Students generally need more help from the teacher and their peers while working with less inclusive tools. In this aspect also differences between groups of students appear. While working with the less inclusive tools, minority students need more help from the teacher and peers than students from the majority population, and in the more inclusive tools it is the other way around. In both types of tools, girls ask more help from the teacher and their peers than boys do. These findings suggest that more help is needed while working with the less inclusive tools. Students from minority groups seem to have more trouble while working with these tools, than students from the majority of the population.

As to reading of the texts, the student observations indicate that in the more inclusive tools students read the text well, while in the less inclusive tools the picture is more varied. We found some students who read the text very well and some students who read the text inattentively.

Furthermore, we find some different ways in which students keep concentrated. In the observations we found some girls talking to themselves while working, while boys follow the text they are reading with the mouse.

Finally, in less inclusive tools students often have to list the answers to the tasks in a Word document. Girls and students from the majority population pay more attention to the layout than boys and students originating from minority groups.

Table 6

Student behaviour; Role & Approach

Girls	
Minority	Majority
<p><i>Less inclusive tools</i></p> <ul style="list-style-type: none"> • Reads the text, but not attentively. Has difficulty with finding the answers she needs. Types answers. Asks the teacher for help on the content three times. Asks two times for help from her neighbour. Provides help once. Works individually. • Reads the text with attention. Blocks and types text. Works individually. Asks for help from neighbour once. • Reads the text with attention. Works individually. Asks for help from teacher once about the content. 	<p><i>Less inclusive tools</i></p> <ul style="list-style-type: none"> • Reads text extensively (also the introduction). Works individually. Blocks texts and types. Helps the neighbour once and does not ask for any help. • Reads text well. Works individually. Talks aloud to herself sometimes. Neither provides help, nor asks for it. • Reads the text with attention. Works individually. Has blocked the questions in the answer document. Types answers. Asks for help from the teacher once about the content and

More inclusive tools

- Works partly together with friend (speech and listening French) and partly individually with the computer. Asks for help from teacher on computer problem.
- Reads texts with attention. Cooperates with the neighbour. Searches for the answers together with the neighbour and they try to agree on it. They help each other and confirm each other. Types the answers. Tells to the teacher how to get typed text instead of the handwritten text in the program.
- Listens to text on PC with attention. Works individually and partly together with the neighbour (speaks and listens to French texts).
- Reads the text with attention. Asks for help from the teacher once. Works in cooperation with the neighbour. They look for sources on one laptop and the neighbour types the answers on the other laptop. Third girl does not contribute much.

once from her neighbour.

More inclusive tools

- Takes time to read the text with attention. Works individually. Asks three times for help on the content from neighbour.
- Reads the text with attention. Works individually, but consults the other girls. Asks for help on the content from neighbour often and from the teacher twice.

Boys**Minority***Less inclusive tools*

- Reads texts, while moving the mouse on it. Cuts and pastes texts. Works individually. Asks once for help from teacher. Provides help to neighbour twice.

Majority*Less inclusive tools*

- Reads the text not attentively. Blocks texts and types. Asks for help from teacher once about the content. Asks neighbour or types the answers from neighbour. Works 'individually'.
- Reads text with attention. Appoints text with the mouse. Blocks and pastes texts. Has a question for the teacher once. Works individually.
- Reads text with attention. Types the answers. Works individually and sometimes consults the neighbour. Helps neighbour once.
- Reads texts with attention. Cooperates with friend (1 PC). Consults about the answers. Sometimes he types or uses the mouse (mostly done by his friend). No need for help.

More inclusive tools

- Works individually. Chooses to prepare a test with help of the schoolbook. Has to plan his work on a note. Uses laptop to look at web quest. Asks the teacher about the content once.
- Works in cooperation with the neighbour. Discusses the allocation of tasks and the content of the PowerPoint presentation. They both have a laptop and they use different screens in addition to each other.
- Reads the texts with attention. Works

individually. Doesn't ask for help and doesn't provide it.

- Looks up the web quest. Asks teacher something about it. Works individually. Chooses to prepare the test with books.
- Waits until the e-mail with the PowerPoint presentation of group member arrives and then starts to work with it. Consults with group members about the slides, and with the teacher about the allocation of tasks. Works on his own part of the presentation.

- Reads texts with attention. Works individually. Gets irritated by wrong numbering of the answers. Doesn't ask for help.

More inclusive tools

- Reads the texts first and writes answers on paper. Works individually. Doesn't ask for any help and doesn't provide it.

To summarize, our results show that in lessons with more inclusive educational tools student participation is better, compared to the lessons in which less inclusive tools are used. Students read the texts better, they ask less questions to the teacher and to their peers and they collaborate more while working with the more inclusive tools. Furthermore, we found different responses between students in relation to gender and origin. When working with the more inclusive tools, girls and minority students participated and collaborated more than when working with the less inclusive tools. The results suggest, furthermore, that when using the less inclusive tools, students from minority groups needed more help than majority population students.

5. CONCLUSIONS AND DISCUSSION

The role of ICT in education has increased rapidly over the last decade. However, there are indications that students do not benefit equally from the potential learning

effects of ICT in education (Schofield & Davidson, 2002; Solomon, 2002). Differences between students' experiences while working with a particular educational tool in school, are related to experiences with ICT outside school, interests, attitudes and learning approaches. These factors are, in turn, influenced by gender and the socio-cultural background of students. Moreover, students' appreciations of educational tools are different, and tend to be related to gender and origin (Heemskerk, Volman, Admiraal & Ten Dam, submitted). In order to realize the potential of ICT in education when it comes to facilitating differentiation and individualization, differences between groups of students should be taken into account.

In this paper we used the concepts of social scripts in order to understand the mechanisms on inclusiveness. We focused on the social scripts embedded in the formal curriculum level of educational tools and investigated how these scripts work out in domestication processes at the operational curriculum level in terms of teacher behaviour and student activities.

From the analysis of the *formal curriculum level* it appeared that differences between the educational tools exist in the social scripts in the content and to a less extent in the interface of the tools. The most important element in distinguishing the more and the less inclusive tools, however, is the instructional structure. In the less inclusive tools, all students were supposed to work individually by reading texts and answering questions. They were supposed to work at the same level of difficulty without adequate support, scaffolds or help functions. In contrast, the more inclusive tools were more compatible to different ability levels and learning approaches by addressing different skills of students, supporting collaboration between students, providing students with adequate support and giving students the opportunity to put in their own experiences and information. Finally, in these tools students had to take more responsibility for their learning process.

The results of our study suggest that at the *operational curriculum level* teachers hardly modify the social scripts in the design of the educational tools. Modifications in relation to the inclusiveness of the content and the interface were hardly found. Teachers do influence the inclusiveness of the tools in terms of instruction. Teachers varied in the extent to which they adapted their instruction to students' prior knowledge and their learning activities, and in the extent to which they provided help. However, teacher behaviour that might be interpreted as reinforcing the inclusiveness of the instruction was shown more in relation to the tools that were already more inclusive. So, teachers' actions hardly modify the scripts of the educational tools.

The social scripts as found in the design of the tools, and the inclusiveness of the tools as enacted in teacher behaviour in the classroom while working with the tools, seem to have their effects on the way students work with the educational tools.

Firstly, the more inclusive tools require less ICT skills than the less inclusive tools. In contrast to our main conclusion about teacher behaviour, teachers pay more attention to ICT skills while working with the less inclusive tools than teachers who are working with the more inclusive tools. In this aspect, they compensate for the social scripts in the tools. The more inclusive tools require less reading skills as

well. Student observations show that in the less inclusive tools the students vary in the way they read the texts, while in the more inclusive tools they all read quite well. In the more inclusive tools texts are shorter, and more mixed with pictures or images, which might relieve the difficulty of reading.

The more inclusive tools accommodate different learning activities by offering more possibilities to cooperate than the less inclusive tools do. Girls and students originating from minority groups utilize this possibility more than boys or students originating from the majority of the population. Working with the less inclusive tools evoke more questions than working with the more inclusive tools, especially for girls and students originating from minority groups. Girls ask for more help from the teacher and their peers than boys do, which doesn't depend on which type of tool they use.

Finally, the observations show better participation of students while working with the more inclusive tools. In particular girls and students from minority groups were more concentrated and actively involved in these lessons, compared to lessons in which the less inclusive tools were used.

There are some critical reflections to be made on the current study. It is a small scale study with data from 6 teachers working with 6 tools in 4 classes with some 81 students. Moreover, we selected our schools for this study on the basis of some criteria one of which was the experience with the use of educational tools. The idea behind the selection has been that we need some experience at school with educational tools in order to be able to study teacher and student behaviour while using the educational tools.

More information is needed to find support for our main conclusion that teachers strengthen the social scripts, as present in the design of the tools. Another issue concerns the fact that, in our study, teachers chose or even designed the educational tools they worked with in the classroom. This is common practice in Dutch secondary education. However, this also suggests an alternative explanation for our findings. Teachers, who choose or even design more inclusive tools, are probably more aware of diversity in the student population and, consequently, behave in a way which could be interpreted as reinforcing inclusiveness.

The aim of this study was to shed light on how social scripts in educational tools are related to inclusiveness in classroom practice. We investigated how the social scripts in inclusive and non-inclusive tools were enacted in classroom practice in terms of teacher and student behaviour.

This study shows first and foremost, that social scripts are built in the design of the educational tools. Our analysis of the formal curriculum level shows that educational tools indeed differ in the extent of inclusiveness for different groups of students. The design of the educational tools offers room for adjustments and interpretation by the teacher, however. This room is used by teachers as they generally reinforce the inclusiveness of the more inclusive tools and do not affect the inclusiveness of the less inclusive tools. Furthermore, the results indicate that more inclusive tools enhance student activities which might suit girls and minority students more than the less inclusive tools do. Further research is needed to fully understand how

teachers can be stimulated to use the room educational tools offer in order to increase the inclusiveness of the tools for different groups of students.