

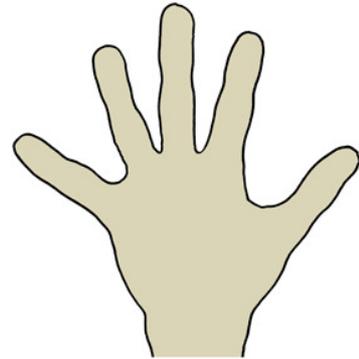
# PROJECT DELIVERABLE

**Grant Agreement number:**  
224216

**Project acronym:**  
HANDS

**Project title:**  
Helping Autism-diagnosed teenagers  
Navigate and Develop Socially

**Funding Scheme:**  
Collaborative Project



## Deliverable description

**Deliverable no:** 1.3.4  
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**Work Package No:** 1  
**Lead beneficiary:** Aalborg University  
**Authors:** Peter Øhrstrøm, Morten Aagaard, Emil Paulsen, Tobias Berglund, Adriana Moca, Joan Vuust Milborg  
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**Summary:** This document presents an overview of the work carried out within the HANDS project in the period from June 1, 2010, to October 31, 2011. It refers to the description of the project in Annex 1 (updated version in 2011). The objectives stated in Annex I are summarized and the work in the reporting period is compared with these objectives. In addition, the report contains chapters on the HAndroid and Sharing Point applications.

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## 1 Declaration by the project coordinator

I, as co-ordinator of this project and in line with my obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate):
  - has fully achieved its objectives and technical goals for the period;
  - has achieved most of its objectives and technical goals for the period with relatively minor deviations;
  - has failed to achieve critical objectives and/or is not at all on schedule<sup>1</sup>.
- The public Website is up to date, if applicable.
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.6) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 5 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of Coordinator: .....Peter Øhrstrøm.....

Date: .....November 19, 2011 .....



Signature of Coordinator: .....

1. If either of these boxes is ticked, the report should reflect these and any remedial actions taken.

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## **2 Publishable summary**

As indicated on the web-site of the project (<http://hands-project.eu>), HANDS is a project that aims to improve quality of life for teenagers with an autism diagnosis by providing a mobile ICT toolset (the HANDS toolset) designed to support them in many everyday situations, in particular in various difficult situations. The HANDS toolset is be designed to help improving the social skills and self-management skills of the teenagers, in order to facilitate or assist their social integration and independence.

The project started June 1, 2008. During the third period of the project, i.e. from June 1, 2010 to October 31, 2011, the following project objectives can be mentioned. The extension of the project period with 5 months until October 31, 2011, is due to the agreement that the project should involve a version of the software implemented on Android smart phones (see below). These partial goals within the project have all been reached during the reporting period.

- Prototype 2 of the HANDS toolset has been implemented and made available at the four partner schools. This also includes a setup using social media.
- Prototype 2 of the HANDS toolset has been tested at the schools as seen from three different perspectives (cognitive psychology, learning and education studies, persuasive technology).
- Based on the experiences with Prototype 1 and 2 of the HANDS toolset at the schools, requirements have been formulated for a new Prototype of the toolset, HAndroid, implemented on Android smart phones. Preliminary testing of the new Prototype has carried out at two of the partner schools.
- The ethical problems related to HANDS have been studied partly from a theoretical point of view and partly based on the experiences obtained at the schools and in the Ethical Board (EB).
- The partners have established a model for the continuation of the HANDS co-operation and the further development of the software and the methods developed during the project.

## **10 partners from 6 countries**

The HANDS project is an EU commissioned project involving 10 partners in different areas, all contributing with different qualifications to make this project work.

*Aalborg University, Denmark (Persuasive Technology and ICT Ethics)*

Aalborg University (AAU) coordinates the HANDS project. This partner is responsible for creating a design for experiments and tests, which can be used for evaluation of the HANDS tools conceived as Persuasive Technology (PT). AAU is also responsible for

designing various methods for the practitioners, so that they can get a view of the actual value of the Mobile Persuasive ICT tools. AAU is responsible for the development of methodology according to which value sensitive design is brought into the process of designing software.

During the reporting period AAU has carried out the tests of Prototype 2 which have been based on the PT perspective. The results are reported in the deliverable D6.4.1, "Prototype 1 - test Results", which presents a catalogue of the data without any further analysis. The interpretative analysis of the data is included in the deliverable, D4.1.5, "PT Test evaluation of Prototype 2 and PT Requirements for Prototype 2." As indicated in the title, this deliverable also includes the requirements for Prototype 2, which are suggested on the basis of the Prototype 1 tests, which have been carried out based on the PT perspective. Furthermore, AAU is responsible for the development of the use of social software (the SPo unit), and the preliminary test of the Android application. In addition, AAU is responsible for the co-ordination and the management part of the project. The co-ordination work of the project also includes the responsibility for the cooperation of the Ethical Board (EB). The work in EB is reported in the deliverable, D1.5.3, "Report III from the Ethical Board".

*Wirtek, Denmark* (Mobile software development)

This partner is responsible for developing software for mobile devices used by young people with autism and software for work stations used by teachers. The software is based on the highly flexible architecture of Microsoft Dynamics Mobile 2008, which enables modular and configurable applications that match the needs and demands of the HANDS Project.

In the reporting period Wirtek, Denmark, has collaborated with Wirtek, Romania, and Edvantage Group as well as with AAU, LSBU and ELTE in order to establish the system requirement for Prototype 2. In addition, Wirtek, Denmark, has participated in the development of the Android Application, HAndroid.

*Wirtek, Romania* (Mobile software development)

Wirtek Srl is a software development house with core qualifications within embedded software, mobile applications, web applications and infrastructure for mobile communications. The Wirtek Srl software development site in Cluj, Romania, was established in 2006 through an acquisition of a Romanian software house.

In the reporting period Wirtek, Romania, has worked together with Wirtek, Denmark, and Edvantage Group on the implementation of Prototype 2 of the HANDS toolset. This work is documented in the deliverable, D5.4.1, "Prototype 2 software and documentation". In addition, Wirtek, Romania, has been working with system support in relation to the use of the software at the four schools and the three universities involved in HANDS. Finally Wirtek, Romania, has been the leading partner in the development of the Android Application, HAndroid.

*Edvantage Group, Norway* (Learning requirements)

This partner is involved in the development of the HANDS toolset. In particular, Edvantage Group is working with interaction design and user interfaces. This work is carried out in close cooperation with Wirtek, Romania.

In the reporting period Edvantage Group, has worked together with Wirtek, Denmark, and Wirtek, Romania on the implementation of Prototype 2 of the HANDS toolset. This work is documented in the deliverable, D5.4.1, "Prototype 1 software and documentation".

*ELTE University, Hungary* (Cognitive Psychology)

This partner is responsible for designing a sound scientific test in order to measure the efficiency of the Personal Mobile ICT tools. This test will be carried out involving 40-50 individuals with autism from the age of 10 to 18.

In the reporting period ELTE has carried out the tests of Prototype 2 which have been based on the perspective of cognitive psychology. The results are reported in deliverable D6.4.1, "Prototype 2 - test Results", which presents a catalogue of the data without any further analysis. The interpretative analysis of the data is included in the deliverable, D2.5.1, "Report on efficiency testing".

*London South Bank University, UK* (Learning Environment)

This partner (LSBU) is responsible for research considering how the use of the HANDS toolset can be integrated in the learning environment, both in special schools and in mainstream settings. Applicability in Learning Environment will focus on how the typical working habits of schools will necessarily influence the design of the HANDS toolset.

In the reporting period SBU has carried out the tests of Prototype 2, which have been based on the perspective of the Applicability in the Learning Environment (ALE). The results are reported in deliverable D6.4.1, "Prototype 1 - test Results", which presents a catalogue of the data without any further analysis. The interpretative analysis of the data is included in the deliverable, D3.5.1, "Applicability Evaluation Report on Prototype 2".

Furthermore, this partner has presented data and findings from the exploratory evaluation of the applicability of the HANDS software in three mainstream school settings (see D8.4).

*Helen Allison School, NAS, UK* (School for children with autism)

As well as acting as a test school, the staff at the Helen Allison School is working with researchers from the academic institutions as part of the evaluation of the applicability of the personal mobile ICT tools in the classroom and wider environment. During the reporting period this partner has been deeply involved in the tests of Prototype 2.

*Egebakken, Denmark* (School for children with autism)

This partner is acting as a test site/test school. The HANDS toolset will be tested with the pupils in their ordinary school environment and in a number of daily situations. In particular, these tests will evaluate the persuasiveness of the toolset. The toolset will be tested twice. During the reporting period this partner has been deeply involved in the tests of Prototype 2 and also in the preliminary tests of the Android Application.

*Svedenskolan, Sweden* (Independent school for children with autism)

This partner is acting as a test site/test school. The HANDS toolset will be tested with the pupils in their ordinary school environment and in a number of daily situations. In particular, these tests will evaluate the persuasiveness of the toolset. The toolset will be tested twice. During the reporting period this partner has been deeply involved in the tests of Prototype 2 and also in the preliminary tests of the Android Application.

*Autism Foundation, Hungary* (School for children with autism)

Autism Foundation plays an essential role in research activities labelled as 'Cognitive Psychology' taking crucial part in the preparation of the two rounds of prototype testing, as well as efficiency testing of the project. These tasks are to be performed in close cooperation with ELTE University, Budapest, and - especially in efficiency testing - with all test sites involved in the project. The specific research tasks of Autism Foundation include methodological preparations, collecting, analyzing and summarising data from all involved partners, and, finally, participation in detailed reporting on all (cognitive psychology) test phases. During the reporting period this partner has been deeply involved in the tests of Prototype 2.

## **Ethics**

The HANDS project aims at empowering young people diagnosed with autism. Although this may be seen as a rather noble goal, we, within the HANDS project, are also striving to make sure that the means used in empowering the young people are ethically acceptable. In order to achieve this, the HANDS project has incorporated an Ethical Board (EB) with representatives from different fields of academia, schools and parents of young people with autism. The EB has, more specifically, been given the task of discussing general ethical questions related to HANDS, in order to – against ethical considerations - evaluate the requirements of the systems which are supposed to be tested and used by children and young people with an autism diagnosis, as well as all tests and experiments involving children and young people with an autism diagnosis.

One important question that has been discussed by the EB is the possible coercive nature of the instructions, advices, or help offered by the handheld devices to the young people with an autism diagnosis. The handheld devices are supposed to help young people with autism

'navigate'. As such the devices are clearly supposed to influence the behaviour of the young people. This, in turn, raises the question of whether the influence exerted upon the behaviour of the young people is ethically acceptable - or whether it amounts to coercion in an unjustifiable manner.

During the year 2010-11 the partners have formulated applications describing the test program which has been planned. The Ethical Board has discussed the applications and suggested some changes which have been incorporated in a revised test plan. The work in EB is reported in the deliverable, D1.5.3, "Report III from the Ethical Board". The theoretical considerations regarding the ethical problems, which are relevant in relation to HANDS, have been reported in the deliverable, D7.4.1.

### **Publications in the reporting period**

The partners have published a number of research papers, discussing and analyzing the design principles and the theoretical ideas discussed and used in the project. In addition, a number of deliverables have been produced according to the work plan. The public deliverables are available from the HANDS web-site and the research papers have been listed in D8.3 with brief abstracts or summaries. The list includes 25 research papers, 13 presentations and 3 posters at scientific conferences, as well as 5 video or TV appearances. Finally, a book describing the results of the HANDS project is under preparation.

One of the major themes in the research papers and in the deliverables is the description of how the HANDS project may lead to results which are useful for teenagers with autism in their everyday life. The expectation and the goal of the project is that teenagers with autism will be able to benefit a lot from software systems like the HANDS tools in their daily routines and that the proper use of such tools can contribute significantly to the integration of young people with autism in society. It is, however, still an open question to which extent such goals (including the obvious socio-economic and societal implications of their realisation) can in fact be obtained. From a more general point of view, it is the expectation that the HANDS project will lead to a deeper understanding of the potential in using software tools for such social purposes. A plan for the further exploitation and cooperation among the partners after the project period has been presented in D8.5. This plan has also been discussed in the Final Report.

## **The objectives and activities in the period**

The HANDS project has five scientific and technological objectives. The project should:

1. develop a HANDS toolset that enables high-functioning young people diagnosed with autism to improve their social skills and self management skills,
2. evaluate the improvement of the social skills and self management skills using the HANDS toolset,
3. evaluate the ethics of the HANDS toolset and the test program,
4. evaluate the usefulness of the HANDS toolset,
5. contribute to the future research and development agenda for accessible and inclusive ICT.

All of these five objectives have been relevant during the reporting period. In the following we present an overview of the aspects of these objectives. The work has been reported in the deliverables and in the research papers. An overview of the work will be given in these sections:

- A. Test and evaluation of Prototype 2 (objectives 2 and 4)
- B. Further developments of the HANDS Toolset (objective 1)
- C. Discussion of Ethical problems related to HANDS (objective 3)
- D. Contribution to the future research agenda for accessible and inclusive ICT (objective 5).

In the following, we shall also take the recommendations 3 and 4 from the Commission (dated 26 October, 2010) into consideration and respond to them as carefully as possible. (The requirements in recommendations 1 and 2 had to do with issues regarding the earlier period and these matters have already been sorted out after the review of the previous period.)

### **A. Test and evaluation of Prototype 2 of the HANDS toolset**

By the end of September 2010 the Prototype 2 software and documentation was finished by WIRU. Since then various tests and more general evaluation programmes have been carried out at the four partner schools. These tests have been designed from three different perspectives (cognitive psychology, learning and education studies, persuasive technology) and they have been established in cooperation with the Ethical Board (see D1.5.3).

The purpose of the tests and more general procedures has mainly been to evaluate the potential for improving the social skills and the self-management skills of the teenagers by using the HANDS toolset. Contributions to the test plans have been produced by the partners ELTE, LSBU and AAU. Leading researcher, Joseph Mintz, from LSBU has taken

care of the practical coordination of the tests results (see D6.4.1). The group has carried out its work in close co-operation with the Ethical Board of HANDS. Further details regarding the tests of prototype 2 of the HANDS tools have been reported in the following deliverables:

D6.4.1	Prototype test 1 Results.	LSBU
D2.5.1	Report on efficiency testing (Detailed report of findings from intensive longitudinal real-life testing of the final prototype.)	ELTE
D3.5.1	Applicability Evaluation Report on Prototype 2	LSBU
D4.1.5	PT Prototype 2 Evaluation Report	AAU

**Table 1 Deliverables analysing the tests of prototype 2**

The deliverable D6.4.1 contains all test results and other evaluation data. According to the DoW this deliverable should present a catalogue of the test data available for further analysis. In addition to describing the raw test data, the deliverable outlines the procedure of the further analysis explaining how the test data during the following months should be analyzed from the perspectives of psychology, education, and persuasive technology, respectively. Finally, it suggests a strategy to ensure a certain homogeneity of the formulation of the results of the employed evaluation strands in order to make it possible to bring the results together in a general evaluation uniting the results of the evaluation activities across the evaluation sites.

This way the HANDS partners have tried to follow recommendation 3 from the Commission in the letter with the result of the review of period 2, dated 26 October, 2010.

Recommendation 3. The evaluation activities for HANDS P2 should consider all employed evaluation strands (of WP2, WP3, and WP4) to ensure the homogeneity of all evaluation activities across all evaluation sites. Evidence is expected to be provided in D6.4.1 on M33.

The partners have found that this recommendation has to be understood in the light of the DoW. This means that there can only be “a certain homogeneity” of the evaluation activities given that HANDS is interdisciplinary and that the academic standards are very different in cognitive psychology, education studies and persuasive design studies. Also, since D6.4.1 is mainly a catalogue of data without any interpretation, the only kind of “evidence” that can be provided in this DL before the analyses are made will be a kind of general methodological explanation of what is going to happen later on. However, this eventually leads to a general evaluation uniting the results of the evaluation activities across the evaluation sites. In D8.5 the results from the three evaluations are brought together in order to obtain a common evaluation and conclusion.

This methodology has been an essential part of the HANDS idea since the beginning. The partners have suggested an update of the DoW (Appendix 1) along these lines in order to make things even clearer. The Commission has kindly accepted this update.

## **B. Further developments of the HANDS Toolset.**

As mentioned above it is the first objective of the HANDS project is to develop a set of software components based on Persuasive Technology, which meets five important sub-objectives:

- a. an efficient tool for the young person to improve social skills and self management skills or to manage social activities;
- b. an efficient tool for the teachers to design and customise the tools for the young person;
- c. an efficient tool for the teachers to measure the progress of the improvements in the social skills and self management skills;
- d. a software design which makes exchange of experiences and software components easy;
- e. tools for the teachers to predict the costs and benefits of using the tools in their work with the young people with an autism diagnosis.

Given the development of the market the partners agree with the Commission that it would be useful and interesting to have the HANDS tools implemented on another platform than the original choice produced by Microsoft. In the present reporting period, the HANDS partners have developed a first version of the HANDS tools for an Android platform. This has been done according to the lines described in the annual report from the second reporting period, P2, D1.3.3, pp. 58, regarding the reporting period. At two of the partner schools the consortium has carried out preliminary tests of the Android application, *HAndroid*. This will be discussed in more details in chapter 5 in this report.

## **C. The evaluation of the ethics of the HANDS toolset and the test program.**

Successful implementation of tools using Persuasive Technology with young people with an autism diagnosis entails a series of ethical issues, which need to be carefully addressed. Persuasive Technology may prove to be a very efficient tool in changing behaviour or attitude, but this must be done with due consideration to the rights of the individuals with autism, in order to maintain their integrity and independence, and to ensure that they remain in control of their own lives to an extent comparable to, or higher than, when not using the HANDS toolset.

In the present reporting period, we have carried out a number of preliminary discussions concerning which ethical themes are relevant. This has been done theoretically resulting in research papers on the topic. It has also been done in a more practical way in relation to the various test programmes in HANDS. In this respect, there has been a close co-operation between the researchers and the Ethical Board (EB) of HANDS. This work has been described in D1.5.3. In response to recommendation 4 from the Commission (dated 26 October, 2010) this deliverable also includes a specification of the procedures for conducting research with human subjects according to the ethical guidelines adopted in the different countries in which the project is performing evaluations.

#### **D. The contribution to the future research and development agenda for accessible and inclusive ICT**

The HANDS project is indeed targeted exploratory research and it has many implications for other marginalised people. In general the HANDS partners are interested in the implications regarding the use of ICT in the broader perspective for the benefit of marginalised people in general. For this reason, the HANDS partners have are open to communication with other researchers and projects dealing with similar problems.

One possibility would be the use of social software in order to include marginalised young people with autism in society. This interesting, but also a rather controversial idea, has been called The Sharing Point (SPo). In Annex 1, DoW, the idea is presented in the following way:

To allow the users to share their knowledge experience and interests the HANDS toolset offers the ability to share UI, customised functionalities and experiences, thus facilitating a protected creative environment for young people with ASD. All users are identified with a psychological and interest profile, which makes it possible for the users to meet others (virtually or physically) with a similar profile. (Annex 1, p. 13)

The task of producing the functionality of The Sharing Point (SPo) has been further clarified in Annex 1 in the following manner:

This functionality offers a virtual social network for the HANDS user pupils to share experiences on HANDS and other relevant things. The profiles of the pupils can contain personal data, special interests of the pupil, groups according to interests and topics, groups in which they exchange experiences using HANDS and exchange experiences in general about being and individual with ASD. The Sharing Point is a safe, monitored and individualized virtual environment, where pupils can learn and practice social skills which are necessary to navigate in a beneficial and appropriate way on the internet. At the same time the SPo should be an attractive and motivating to use for pupils with ASD. It is also allows teachers to share experiences when they teach

pupils. With an open interface, the HANDS users will be able to benefit from communicating with each other. (Annex 1, p. 50-51)

In chapter 6, is described how the HANDS consortium has chosen to put these rather general thoughts into practice.

### **3 The Project Management in the reporting period**

The work in HANDS has been carried out by the partners in close co-operation with Aalborg University as the coordinating partner. The work has been led by Peter Øhrstrøm as coordinator of HANDS. Henrik Schärfe has acted as assisting co-ordinator, and Morten Aagaard has been the chairman of the partner forum, UPDG. Joan Vuust Milborg has served as secretary for the project, and she has together with Morten Aagaard, taken care of the internal communication among the participants in HANDS using a Moodle platform.

The software development and implementation has been carried out by Wirtek Romania, Wirtek Denmark, and Edvantage Group. The HANDS server is placed at Aalborg University.

The consortium has worked closely together with the HANDS Ethical Board with its chairman Søren Holm and its co-ordinator Thomas Ploug.

#### **Change of responsibility in the consortium**

The only change which has taken place in the HANDS consortium during the reporting period is that Morten Aagaard, Aalborg University, has taken over the responsibility for the HANDS website instead of Michael Aaen, Wirtek Denmark. The address of the project web-site is unchanged as stated on the frontpage of this report.

#### **Partner meetings in the reporting period**

The HANDS partners have communicated via the HANDS Moodle Platform. In addition some online meetings and face-to-face meetings have been organised. Some of the meetings have been group meetings dedicated to more specific topics within the HANDS agenda. Two longer partner meetings have been organised partly as HANDS workshops. The first meeting within this period took place in Budapest in December 2010. The main themes discussed at this meeting were:

- The Sharing Point application. Discussion of the general idea and the value of it.
- Testing of the HANDS tools – Status at the schools.

- Prototype II – Discussion of the technical aspects of the system.
- The Android Application. Discussion of the specifications.
- HANDS' accomplishments, errors and potentials so far.
- Business Model + Dissemination/demonstration
- Continuation of HANDS after the end of the project?

A similar meeting was organized in Slettestrand, Denmark, in May 2011. At this meeting the following topics were discussed:

- Design of the Sharing Point facility. How should the SPo facility be produced?
- The future of the HANDS tools. Who should be allowed to use the tools when the project ends? Who should run the HANDS server?
- Further research related to HANDS. The possible publication of a book on the results of the HANDS project and the open questions which have been detected during the project.
- Plan for reporting the result of the HANDS project to the relevant scientific communities, to the schools for young people with autism, to the public?
- The updating of the DoW (Annex1).

The questions mentioned above were discussed carefully at the partner meetings. These discussions have continued and they have all later been reflected in the 11 deliverables which have been produced during the reporting period.

## 4 The deliverables in the reporting period

In the present reporting period, the HANDS partners have produced the following reports and deliverables. All deliverable have been dealing with questions and challenges mentioned in Annex 1. The consortium has organised peer review procedures in order to improve the quality of the reports. In some cases these procedures have, however, caused a minor delay.

The leading partner has in each case been mentioned in brackets below.

<b>DL Name</b>	<b>Description/title</b>	<b>Deadline according to Annex 1.</b>
D5.4.1 (WIRU)	Prototype 2 software and documentation	Oct. 1, 2010.
D8.3 (AAU)	List of papers and conference participation	June 1, 2011. With some later additions
D8.4 (LSBU)	Report on collaboration project with UK schools for autism	June 1, 2011.
D6.4.1 (LSBU)	Prototype 2 Result. Report. This report should present a catalogue of the test data available for further analysis.	June 1, 2011. With some later additions.
D3.5.1 (LSBU)	Applicability Evaluation Report on Prototype 2	Sept. 1, 2011.
D4.1.5 (AAU)	PT Prototype 2 Evaluation Report	Sept 1, 2011. Some later additions.
D2.5.1 (ELTE)	Report on efficiency testing (Detailed report of findings from intensive longitudinal real-life testing of the final prototype.)	Sept 1, 2011
D1.3.4 (AAU)	Annual progress report Special chapters/appendices on: a) Test of the Android application at Egebakken and Svedenskolan. b) Development and testing of the SPo.	Oct. 31, 2011. Some later additions

D1.5.3 (AAU)	<p>Report III from the Ethical Board</p> <p>This deliverable should include a specification of the procedures for conducting research with human subjects according to the ethical guidelines adopted in the different countries in which the project is performing evaluations.</p>	Oct. 31, 2011. Some later additions.
D1.3.1 (AAU)	<p>Final project report - activity, management and financial. This deliverable contains as a separate and distinct part a discussion of the refinement of the HANDS Toolbox exploitation potential.</p> <p>Based on advice from the project officer this deliverable has been split into three reports on activities and management, which is turned in at the end of the project. In addition, there will be later report dealing with financial matters.</p>	Oct. 31, 2011. Some later additions.
D8.5 (WIDK)	<p>Conclusions and recommendations from HANDS to a future research agenda. The results from the three kinds of evaluation of the HANDS software are brought together in order to obtain a common evaluation and conclusion. It also suggests a plan for the further exploitation and cooperation among the partners after the project period has been presented below.</p>	Oct. 31, 2011. Some later additions.

**Table 2. The deliverables in the reporting period**

## 5. The Handroid application

In the present reporting period, the HANDS partners have developed a first version of the HANDS tools for an Android platform, HAndroid. This has been done very according to the lines described in the annual report from the second reporting period, P2, D1.3.3, p. 58 ff., regarding the reporting period.

HAndroid is a partial implementation of the HANDS Mobile (Prototype 2) on an Android platform. The application is compatible with Android v2.2 (and above) and has the following functionalities:

- Using authentication, the application connects to the same server and uses the same credentials as the HANDS Mobile application does. The necessary information is sent from/to the server using synchronization. The data is specific to each user and can be updated either manually or automatically at a certain period of time.
- The Personal Trainer (PT) was implemented to offer social stories with emphasis on multimedia rather than text. A PT is an open step by step instruction with the possibility to go back and forth. When exiting the PT there is a possibility of adding a comment as a feedback. The tool is designed to keep the stories and the feedback related to the PTs. This feature is used as an application widget that can be added to the homescreen of the device.
- All the synchronization and accessing actions to PTs by a pupil are saved on the server using a logging system. The collected information is displayed in the same manner as previously, on the website. Setting up PTs and customizing the Toolbox can be done accordingly for each pupil, using the same web interface as for HANDS Mobile.

The Android application, *HAndroid*, was ready for use in the August 2011. During a short period in September 2011 some preliminary tests of *HAndroid* have been carried out at Egebakken and Svedenskolan. Data have been collected in the form of interviews reported below with the persons who have been testing the system.

Due to a tight deadline the testing of *HAndroid* only lasted a few days. The pupils were equipped with a "HTC-Desire" and had about one week to get used to the phone before they started testing the *HAndroid* application.

The content of the stories were prepared by the pupils' teachers and put onto the mobiles by the HANDS lead teacher. The subsequent interviews of the pupils were carried out by the lead teacher one pupil at a time. The interviews lasted between 15 and 30 minutes.

In the following we shall report the comments regarding *HAndroid* from the teenagers and the teachers at these two partner schools. The responses from the pupils have been translated by the teachers at the schools.

## Comments from the teenagers at Egebakken regarding the HAndroid application

HAndroid is running as a so called "Widget"-application – what do you think about that?

**Pupil 1:** *HAndroid* is a million times better than the previous versions of HANDS. It's really great that *HAndroid* is running as a Widget. You no longer have to start up the application - now it's just there. It's easy just to slide over to the application and back again. It's also faster and smoother to handle.

The visual impression is good. The general interface looks cool and modern. The icons are also nicer to look at.

**Pupil 2:** I like that *HAndroid* has its own screen. If you only use a few functions you might not have needed the Widget to take up a whole screen but of course if you use many functions it's cool. Just an idea for further improvements of the Widget – generally I think the new version is really nice.

I like the visual design. It's user friendly and easy to get started with.

Can you say something about the PT-function?

**Pupil 1:** When you slide between the pages in the stories you have to be a bit careful or it might run through several pages really fast. No need for improvements regarding the pictures, text or icons.

**Pupil 2:** No problems sliding through the stories and both pictures, text and icons looks nice. It can be a bit confusing if you by accident press one of the pictures in the story. Then the picture pops up with its own screen and you need to press the "back-button" in order to read the rest of the story. There is really no need for this function.

Do you think the HAndroid PT's could help you?

**Pupil 1:** Well I have used a step-by-step story with instructions about the content of the SPo Facebook groups. Of course this worked because it was just simple instructions.

I also tried a PT with a social story about "not to tell my classmates what to do". It's a focus area that my teacher wants me to work with. I read the PT in the morning and it helped me as a reminder. After reading the story I did not do it as much – but sometimes I felt so provoked that I did it anyway.

**Pupil 2:** Besides the Facebook story I had a story to remind me about what to bring to school and what to remember when making a sandwich at school. The story is alright but because we were in a hurry when testing the *HAndroid* I did not talk enough with my teacher about it. It reminds me of a lot of things I don't need to be reminded about - but for others more autistic persons it would probably help.

Can you try and compare the *HAndroid* and HANDS?

**Pupil 1:** It's a very simple application but it is really good at the things it does.

**Pupil 2:** I did not like PT2 at all – it was not something for me. The *HAndroid* is much nicer even though I mostly use prompt and reminders and not so much stories. I feel more motivated because of the cooler graphical layout.

Do you have ideas for improvements?

**Pupil 1:** It could be nice if you were able to e.g. take a picture or a videoclip with you phone and put it directly into a PT. It could be during a gym-lesson where you take a picture and a piece of video of the goalkeeper. When you press the picture, a short video will appear telling the rules for being a goalkeeper.

It would also be nice if you were able to drag-and-drop other icons from the mobile (e.g. the Google Calendar or Facebook icon) and put them into the *HAndroid* Widget screen.

**Pupil 2:** I think some people could use help functions telling them what to do if they were in an emergency. Like shortcuts with phone numbers to call – maybe combined with a step-by-step story.

Do you have other things you want to say that haven't been covered yet:

**Pupil 2:** Well I don't have a need for the integration of the HIPD on *HAndroid*. I really like to use the Google Calendar and it covers my needs. It might however be useful with the integration of some simple reminders and prompts on the *HAndroid*.

### **Some reflections by the teachers at Egebakken on *HAndroid***

*Widget:* A new thing is *HAndroid* running as a so called "Widget". This is a really nice feature because it makes *HAndroid* a more integrated and easy accessible application. It is no longer a program which has to be opened – shutting out other tools and applications on the phone. The user interface is really impressive and you feel that *HAndroid* is a contemporary piece of software. The default icons still look ugly and pixilated, but this is probably due to the default settings on CoMe and easy changed by the experienced user. If you want to turn *HAndroid* into a commercial piece of software it would be appropriate to change the default icons.

*PT's:* The way the PT's works are pretty similar to HANDS. It's a pretty simple function useful for both social stories and, step-by-step instructions. I think the text is a bit too small even though the biggest size is chosen on CoMe. This is also the case for the pictures that doesn't fill out the whole screen. The gray background is also a bit dull. The creative use of mobile alarms or appointments from Google Calendar to prompt the pupils to read the PT's, adds further potentials to the *HAndroid* PT's. This is also the case when using reports on CoMe to track when the PTs have been read.

*CoMe:* From a teacher's point of view the interface on CoMe is essential. It is definitely the biggest challenge regarding a commercialization of the *HAndroid* product. CoMe is not particularly user friendly and it is a platform made for handling an expanded HANDS

toolset. You feel like navigating on a huge and complicated platform just in order to perform a simple task.

*Improvements:* Regarding future improvements of the *HAndroid* Software I would suggest the possibility of triggering the PT's at a specific time. At the moment you can set an alarm on the mobile with a message telling the pupil to read e.g. a social story or step-by-step instruction. When the pupil reads the message he has to navigate over to the *HAndroid* Widget and find the correct story to read. If you are able to make the story pop up at a specific time you would improve the chance of the story being read.

## **The use of the GPS functionality**

The HANDS partners have in particular discussed the possibilities of using the GPS functionality as an integrated part of the *HAndroid* application. Using this functionality it will be possible to log data on the HANDS server regarding the locations at certain times along with the activities performed on the smart phone.

As there are obviously important ethical problems to consider concerning logging of such in principle person sensitive data the consortium has discussed the matter carefully with the HANDS ethical board (see D1.5.3). The decision has been to limit the first study to a pilot study only involving a few teenagers.

The Ethical Board has advised the researchers not use continuous logging of co-ordinates but only logging related to a specific area. In addition, the Ethical Board has raised the question of access to the data. In fact, differentiated access to data can in fact be given to the teachers, parents and researchers:

- Teachers: Data may support any activity on behalf of the teacher except for the particular purpose of tracking the user.
- Researchers: Anonymized data may be freely accessed.
- Parents: A clear policy is required. It may provide same access as teachers or deny such access. May be negotiated at school level. The policy should be available to the children using the phone and they should be informed of the content of the policy.

## **A Pilot Study involving GPS Carried out at Egebakken**

From March 17, 2011 to May 12, 2011 a pilot study involving the use the GPS functionality has been carried out at one of the partner schools, Egebakken, Denmark. The idea of this pilot study is to focus on certain children with a low level of school attendance, which may partly be caused by problems related to bed times in the evening and thus difficulties

getting up in the morning in time for school. The setup used is that the teenagers are prompted in the evening when they are supposed to go to bed and given a few possible answers. A prompt should also be sent to the phone in the morning in case it cannot be located within the school area. Again the teenager should be given the opportunity of responding.

This present study at Egebakken only included one teenager. The study has been carried out by lead teacher Emil Paulsen and other teachers at Egebakken in co-operation with researchers from Aalborg University.

The teenager who was chosen for the GPS-experiment was characterized by having severe problems regarding school attendance. In some periods he was absent from school 50-60% of the time. Furthermore, this teenager was very capable of and motivated for upon using both ICT and in particular mobile phones. At the time, he had an iPhone which is not able to run the GPS-application. For reasons regarding persuasiveness it is important not to use multiple devices and therefore he was asked only to use his new Android phone. He ended up getting quite happy with the Android device and he is still using it several months after the pilot study.

A prompt was sent to the phone every night at 11 p.m. (bed time). Each morning at school start (8.30 a.m.) a prompt was sent to the phone in case it couldn't be located within the school area. As mentioned above the teenager was given the opportunity to respond to the prompts choosing between a small number of possibilities. All prompts and answers given by the teenager are stored at the HANDS server. The teenager himself has formulated his view on the setup in the following way:

The first weeks there were a lot of problems regarding the prompting. This was pretty annoying to begin with but fortunately it got fixed. I think the idea about GPS-prompting is good and it could probably help others with the same problems as mine. However I don't think it has had any particular effect on me. Sometimes, I can be lazy and just can't find my inner motivation to go to school. If I get some kind of prompt or reminder that tries to motivate me I will just ignore it or shut it off. The major reason why I improved my attendance is the fact that I need better results at school and better attendance in order to go to AspIt (a special ICT-education for pupils with Aspergers). *[Extract of statements, translated by Emil Paulsen, Egebakken]*

It seems that the key to the pupil's school attendance is his motivation towards getting accepted for further education (AspIt). The GPS-application cannot exceed or replace this motivational factor. However, in the current use of the application it has mainly been tried to support this fact by reminding him to go to bed or to school at the appropriate time.

During the pilot study data have been collected in the interaction with the server. In addition, the teenager and his teacher have been interviewed. The pilot study suggests that a GPS-application

- can in fact be introduced in a school setting as a tool, which teenagers will be ready to use in order to deal with practical and personal problems;
- can be developed in way that will be experienced by the teenager as attractive – also when he does not have to;
- can stimulate the awareness of the school attendance problem by letting the teenager respond to questions regarding the problem they are dealing with;
- can create a useful background for the teacher in his conversation with the teenager over the school attendance issue.

There are, however, also several practical and ethical problems, which should be further discussed before a proper experiment regarding school attendance can be set up.

- Which answers should the teenager be allowed to give as a response to the prompts?
- For how long, should the data be stored on the HANDS server?
- Who should be given access to the data on the server other than teachers and researchers? What about the parents?
- How should the questions concerning the stored data and the access to the data be formulated in the informed consent form presented for the teenager and his parents?

## **A Pilot Study involving GPS Carried out at Svedenskolan**

A Pilot Study similar to the one mentioned above has been carried out at Svedenskolan. Lead teacher Tobias Berglund describes it in the following manner:

### *The pupil and his phone*

The pupil was selected because of his excessive absence from school. He also had troubles to come to school in time. The pupil had earlier in being a part of PT 1 shown interest and motivation to use a smartphone and the functionalities that came with such a device.

### *The school attendance*

As we already did work with this pupil regarding his low school attendance his attendance did go up some prior to the GPS tests. But we did in the beginning see a slight raise in both attendance and his ability to come to school in time. If this was due to the GPS functionality or all other work we had done or parts from both is hard to say. One thing is certain, the GPS functionality did help him to get to school in time, this is a statement from him self.

His attendance did vary a lot and it is hard to us to see an overall raise in his attendance over a longer period of time.

*The GPS-function from the pupil's point of view (translated compilation of statements)*

There were some problems with prompts going off at the wrong time, which of course was annoying. I think the GPS functionality could help me if I just shaped up and did more of what I am supposed to do. I did need to get my attendance at school up so I can get my grades up so I can finish school with a grade in every subject, so there are a lot of things that does make me feel I should be more at school. But sometimes I just did not bother when the phone asked me if I was on my way to school. The phone was good and I could listen to music.

*The GPS-function from a teacher's point of view*

This pupil did have a high absence from school. We tried a lot to motivate him, and he was also motivated himself to get his grades up. Putting all these parts of motivational work together I do believe that the GPS function did have an impact on the pupils attendance. The main reason to this is that this was the only function we used to alert the pupil at the right time when he was at the wrong place, and that is something we not could have done with any other tool available to us. And as Emil Paulsen at Egebakken also said, we believe this although the pupil may not be aware of this effect.

## **The use of HAndroid at Svedenskolan**

The *HAndroid* application has also been introduced at Svedenskolan. During September 2011 some preliminary experiences have been obtained. Tobias describes these experiences in the following way:

The first thing to do was to fit the participating pupils with a new phone running Android. This was done during their summer holiday. This was to get the pupils familiar with the new system so there would not be so much time spent on them learning that also on the short period of time we had to test HAndroid. This might have been wrong.

It was hard to find a good way of getting the pupils to know when to read their PT. The HAndroid is not connected to any functionality that makes it possible to remind the pupil to read a PT. We had some ideas about using the gmail calendar system as a reminders, but having to work in two different systems seemed to get a bit much work. This did that we were to try out a new way of getting the pupils prompted and to find something to write a PT about that did not have to do with a particular time. We talked to the pupils about what a new PT could be about, this was hard task for them. We then tried to find such behaviors/problems, but that was also hard. When approaching pupils with ideas they were not so positive about using the HAndroid and PTs at all. The phone on the other hand was really appealing to them, and they

did use their phones in the work with SpO. As time ran out we did not manage to come up with any actual measurable work being done on the HAndroid system. When first talking to the pupils about HAndroid they were very positive about how it looked. But they did more fancy their new Android-phones in all.

I must unfortunately say that the HAndroid on Svedenskolan was a failure. This was due to a number of things. Lack of being able to put in the work hours needed, not being able to come up with good PTs, and that the pupils themselves not were motivated. What could we have done in another way? Maybe it was wrong to get the pupils their phones in advance, now they felt it as it was theirs and was not motivated to use it as an aid.

*Comments on functionality;*

PTs: It would have been good if the slides of the PT;s not would have been running past when you swiped one picture. If you're not careful it's likely that you miss one or more pages. The visual appearance could also be improved, in all its improved since PT2 but to fit the Android (or any other new system) it still needs polishing.

CoMe: Is in all a good system. But, it is (still) slow and it takes a lot of time to do things. It could definitely be more user friendly.

Improvements: Although we did not manage to get the HAndroid tests to be a success, we still have some points on improvement. The main issue around the HAndroid would be to get it triggered and shown at a specific time.

## **Conclusion Concerning the HAndroid Application**

There can be no doubt that the Android application is a useful addition to the HANDS software. However, there are clearly still a lot to do in order to make this application optimal.

It is important to be aware of the two factors when trying to change the behavior of an autistic child. The first is the inner the motivation. In the use of HAndroid to improve school attendance it is noticed that inner motivation to some extend is at hand. In B.J. Foggs model Behavior Model

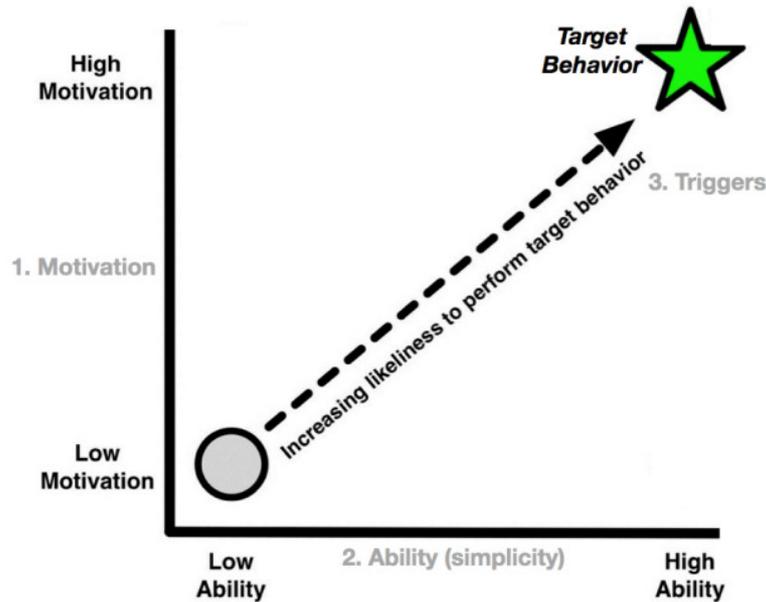


Figure 1 B.J. Fogg's model Behavior Model

the likeness that the behavior change occur is far higher when high motivation exist and the triggers only need to make use of few persuasive effect. A prompt at the right place can be sufficient.

In the case HAndroid the motivation was to some extent at hand and the HAndroids prompting had an effect. But such a conclusion cannot be generalized to all pupils with poor school attendance. Pupils with an autism diagnosis are different and deciding to use the HAndroid application should be based on a pedagogical consideration that includes analysis of the motivation structure of the individual pupil, as well as alternative other activities that may increase the awareness on the importance of school attendance. In other words, the use of HAndroid in autism pedagogic has to be consistent with the general autism psychology: if you have met one individual with autism you have met one! But the teachers toolset is extended with a tool independent of place and time.

Secondly, the pupils emphasize user friendliness and look nice features. The properties that are important for neurotypicals as well. But due to the lack of patience with individuals with autism it is even more important that the immediate impressions are nice.

## 6 The Sharing Point (SPo)

In the original HANDS proposal the following is stated:

*To allow the users to share their knowledge experience and interests, the HANDS-toolset offers the ability to share UI, customised functionalities and experiences, thus facilitating a protected creative environment for young people with ASD. [HANDS Annex I (2008), p.13]*

Users can be interpreted as the caretakers (e.g. teachers), who may share knowledge, experience and interests or it can be interpreted as the pupils, who may share knowledge, experience and interests. In the initial HANDS work on Prototype 1 and Prototype 2, the former interpretation was chosen, as teachers needed to be able to share templates and best practice approaches to ease the production of highly individualised solutions. In respect of sharing between pupils, the description of our SPo is documented in D4.3.1<sup>1</sup>.

According to Annex 1, the consortium should test whether pupils can benefit from the opportunity to share knowledge, experiences and interests. For this reason the partners have designed and run the experiment “Sharing Point for pupils - an ASD experiment”. This section contains the documentation and analysis of this experiment.

The obvious good reason for such an experiment is that pupils with ASD are vulnerable and have a high risk of being socially excluded. Social Network Sites (SNS) like Facebook, BeBo, Google+, etc. may have elements enabling the pupils with ASD to develop and be e-integrated in a manner that is suitable for the individual pupil. Such integration may be in terms of their ability to use such SNS sites effectively given the social impairments associated with ASD. Further, it may also be in terms of the support that online social interaction may give to social interaction in real world settings. The pupils’ use of HANDS, a mobile technology solution focused on the development of social and life skills, sets the context for their involvement in the SPo. In other words, they potentially have the opportunity to share experiences about using HANDS and being involved in the HANDS project, although this may only be a starting point for their experience with the SNS.

### Research hypothesis

In the ICT society, individuals who do not master ICT are at the risk of being excluded. Not being able to manage their own private economy, not being able to shop electronically or being involved in cultural activities either taking place online, offline or both, not being able to stay in touch with friends and relatives, can lead to an experience of exclusion. This

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<sup>1</sup> Accessible at the HANDS homepage as:  
HANDS\_D4.3.1\_no\_app\_AAU\_R\_PU\_2010-07-15.pdf

can apply to a variety of groups who, for social and economic reasons due to disabilities, cannot access the online world.

Mertens et al describes the exclusion of such “offline youth” as follows:

*They (offline youth) suffer a double e-exclusion: they experience difficulties to participate in the e-culture of the youth and they have no competences enough to access the e-world of the adult society.* <sup>2</sup>

Furthermore, they emphasize that it is not only a matter of operating the technology of the adult’s e-world and/or young e-world. They call the one e-world “...foreign and ill-known territory.” <sup>3</sup>

The Danish SNS researcher, Malene Charlotte Larsen, supports the understanding of the challenge of being involved in SNS and the negative consequences of not participating:

*“practicing friendship is an essential part of Danish young people’s use of social network sites. ....users carry out (actions) to create or maintain social relations”.* <sup>4</sup>

Furthermore she emphasizes that friendship online and offline may transform the way friendship is conceived.

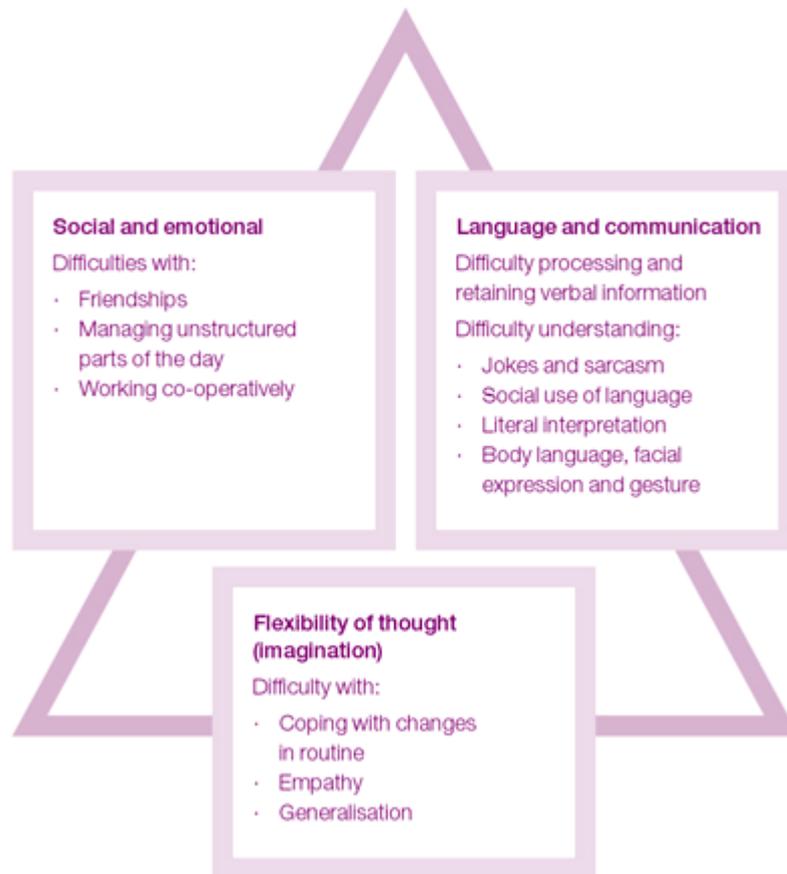
The ability to understand the rules of social interaction in SNS is an area in which the children with autism are heavily challenged as seen from Wing’s widely accepted triad of impairments:

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<sup>2</sup> Mertens,L., Brotcorne,P. and Valenduc, G.: Offline Youth and the digital divide: Revisiting the concept of “Digital Natives”, in Proceeding s of the INCLUSO 2010 conference, p.77

<sup>3</sup> Mertens,L., Brotcorne,P. and Valenduc, G.: Offline Youth and the digital divide: Revisiting the concept of “Digital Natives”, in Proceeding s of the INCLUSO 2010 conference, p.77

<sup>4</sup> Malene Charlotte Larsen, Youth and Online Social Networking: A Nexus Analytic Study of Mediated Actions and Public Discourses\_p8(v), [http://vbn.aau.dk/files/36940773/ph-d-afhandling\\_malene-charlotte-larsen.pdf](http://vbn.aau.dk/files/36940773/ph-d-afhandling_malene-charlotte-larsen.pdf) accessed october 2012



Lorna Wings Triad of impairment<sup>5</sup>

The two relevant areas in relation to SNS are “Social and emotional” and “Language and communication”. These areas can encompass the ability to process and retain verbal information, i.e. difficulties understanding jokes and social use of language and difficulties generalizing experiences. Difficulties with “Friendship” such as a lack of appreciation of others’ perspectives and of their intentions can be particularly aggravated in online settings.

In other words, their impairments challenge them heavily when using Social Network Sites. However, other aspects of impairment such as mis-recognition of facial expressions and other emotional signals, could arguably be less of a hindrance in online environments, although there is little evidence to support this argument at the present time.

In other words, there is a fair chance that involvement in SNS will fail. On the other hand, if those barriers or challenges are adaptable or match their competences, particularly within a modified supported environment, then individuals with an autism diagnosis have an opportunity to be challenged and manage the challenge, improve his or her communicative skills and become e-included among their friends.

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<sup>5</sup> Gould, Wing: The Triad of Impairments in Children with Learning Disabilities, 1979

Initial impressions from the teachers involved in the HANDS project indicated that both cases exist. In their experience, some pupils cannot understand the communication on SNSs like Facebook and get angry with the persons they communicate with. Other pupils at the schools already benefit tremendously from having profiles on Social Network Sites and from engaging in online communication.

These initial considerations lead to 4 hypotheses that we will investigate in this HANDS SPo experiment.

#### Hypothesis 1

*Young individuals with an autism diagnosis can benefit from being involved with Social Network Sites. They benefit by training and improving their ability to have friendships in an online setting, they benefit from training and improving their verbal skills.*

#### Hypothesis 2

*Monitoring the young individuals with an autism diagnosis while using the Social Network Sites, can be beneficial for the caretakers and the pupils themselves. They benefit because conflicts can be avoided.*

#### Hypothesis 3

*Using Social Network Sites requires that the young individuals with an autism diagnosis are heavily challenged. They are challenged in terms of their general poor reading and writing skills and in terms of their lack of friends that they can meet in SNS*

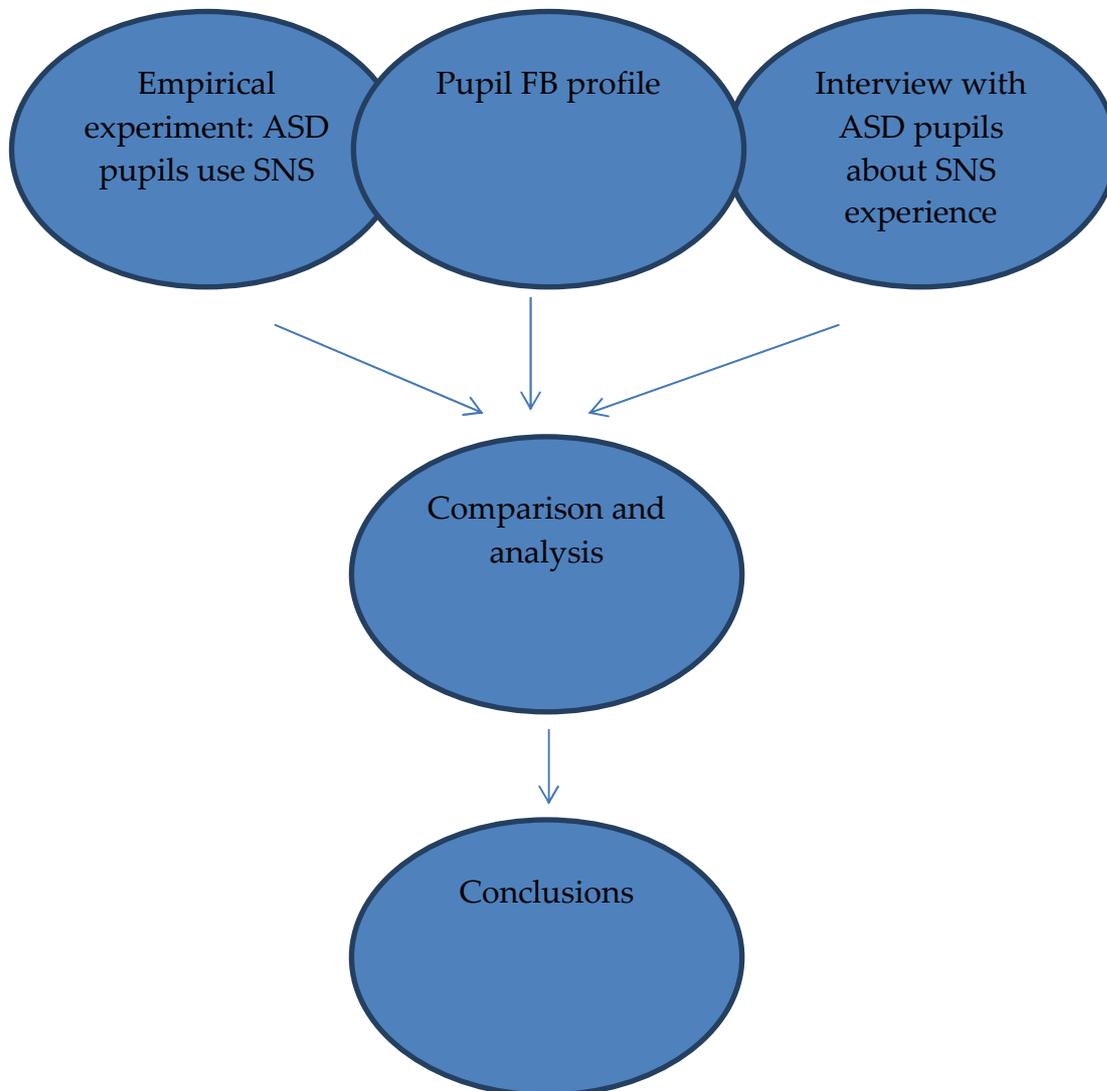
#### Hypothesis 4

*Exchange of personal experiences at Social Network Sites among young individuals with an autism diagnosis can prove highly valuable.*

These four hypotheses are in the focus of the HANDS SPo experiment.

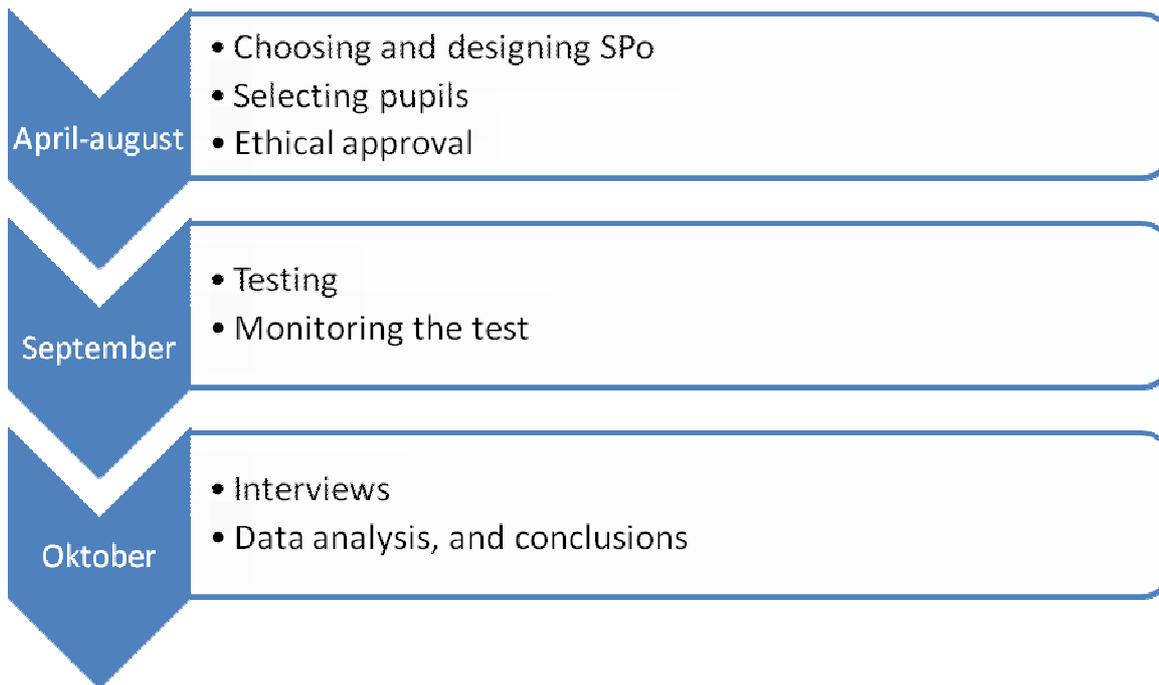
## Methodology, Design & Time plan + Ethics

Methodologically speaking this is an empirical experiment where the empirical usage data are combined and validated using after-use interviews with the involved pupils.



*The SPo experiment – overview*

In terms of time planning the experiment lasted approximately six months including the summer vacation and preparation in spring. The SPo online usage experiment lasted 1 month.



*The SPo experiment – time planning*

Regarding choosing and designing the SPo platform it was a difficult choice due to very complex requirements.

The Consortium (and in particular the UPDG) considered the requirements and candidates.

The candidates for the SPo experiment were:

1. Specific HANDS-developed SNS
2. Facebook
3. Pinax
4. Podio
5. Moodle

The requirements in question were:

1. Standard SNS functionality should be supported (messaging, groups, feeds, sharing of many kinds of data, interactivity)
2. Language support of 4 languages
3. Avoid introduction of new systems for the pupils that could promote pupil difficulties or refusal of SNS
4. Solution should be in agreement with ethical standards of HANDS

It was not an easy choice, but after a number of meetings the Consortium agreed that the requirements 3 and 4 seemed to be the most important ones.

Our scoreboard for the candidates looked like this:

	Standard SNS Functionality	Language support	Avoid introduction of new systems	Ethical standards of HANDS
HANDS developed SNS	Not advanced	Yes	No	Yes
Facebook	Yes	Yes	Yes	Probably
Pinax	Not advanced	Yes	No	Yes
Podio	Yes	No	No	No
Moodle	Yes	Yes	No	Yes

The conclusion was clear: the only SNS that could be introduced without risking rejection by the pupils or other negative effects was Facebook. On the other hand, the ethical approval was uncertain due to the Sky-architecture of Facebook not allowing full data privacy and control. Furthermore, Facebook’s potential carelessness of the data privacy of the users could be a reason for rejecting Facebook as SNS for the HANDS SPo experiment.

### **Ethical Approval and monitoring the young individuals**

The core ethical issue identified was that the test persons are vulnerable children who are not necessarily aware that they act in a public space and that these actions will create digital footprints which, due to Facebook’s privacy settings, cannot be managed and controlled by the users themselves.

An 11 page long application was submitted to and accepted by the independent HANDS Ethical Board (EB), thus Facebook was chosen as the SNS for the SPo experiment. The acceptance was subject to the following constraints, though:

1. Parents and students should be informed in detail about Facebook’s privacy policies as part of the informed consent process
2. The researchers should nominate a specific person, who would be responsible for ensuring that the HANDS group’s privacy settings were up-dated for at least five years after the end of the project <sup>6</sup>

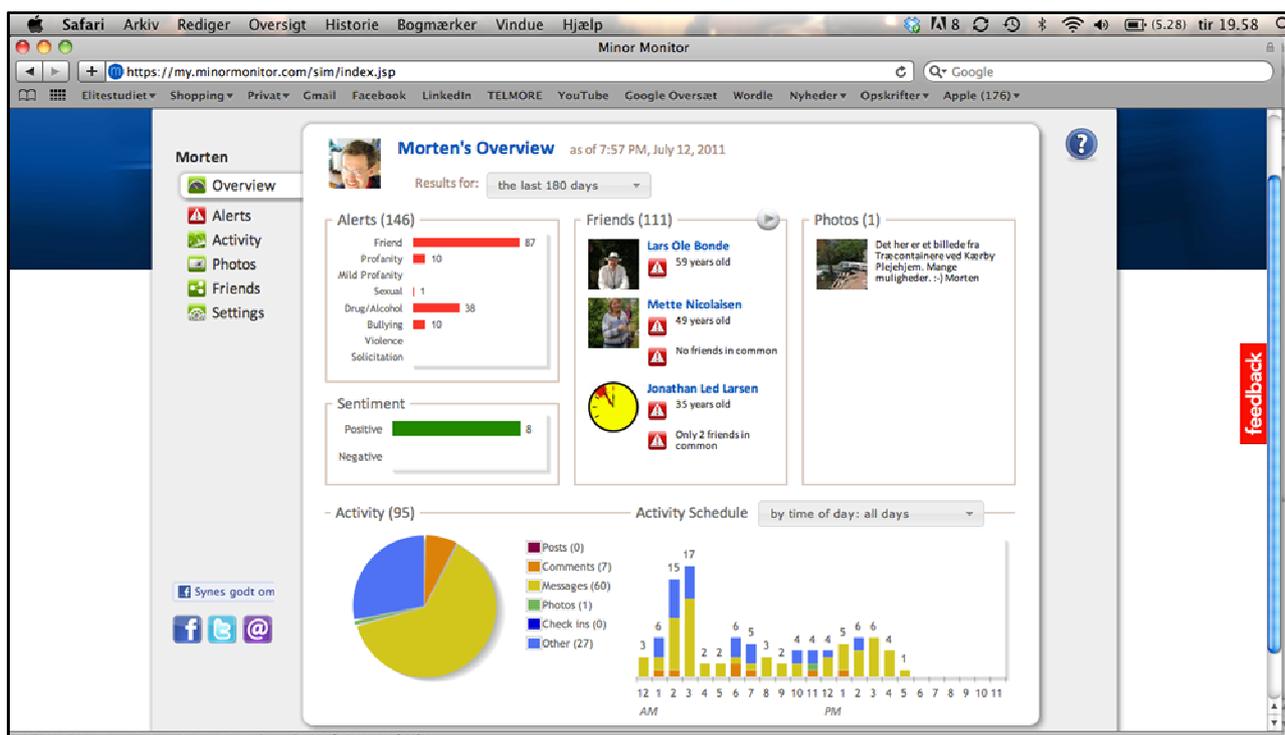
The consortium decided immediately to formulate an “Informed consent” document for the pupils, and Morten Aagaard, Aalborg University, was appointed the researcher responsible for keeping the privacy settings of the HANDS group up to date.

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<sup>6</sup>From “Appendix A, ”HANDS Facebook Group – Ethical Considerations, p 1

Regarding the monitoring of the young individuals with ASD, the SPo responsible (Morten Aagaard, Aalborg University) was asked to make a survey of the parental control tools for Facebook. It had been reported by teachers that some youngsters using an SNS like Facebook ended up having a very poor experience, resulting in very angry reactions, destroying equipment and the like. This can be due to poor communication skills and the lack of ability to understand the other communication partners' expressions and intentions.

Within the preparations of the SPo experiment a survey on parental control applications for Facebook was evaluated<sup>7</sup>, but due to ethical concerns and the fact that none of the proposed participants were willing to consent to monitoring, no monitoring tool was used.



*Screenshot from the Parental control application, Minormonitor*

## The data of the experiment

The SPo experiment lasted for one month. The SPo consisted of four Facebook groups

### 1. Visual Jokes

<sup>7</sup> The most interesting overview of parental control applications for Facebook can be found here <http://facebook-parental-controls-review.toptenreviews.com/>  
<http://www.allfacebook.com/7-tools-that-monitor-your-children-on-facebook-2011-03>

2. Personal Experiences
3. HANDS General
4. HANDS experiences

The selection and creation of these groups were based on a number of User Participatory Design Group meetings taking place between the Spring and Autumn of 2011. The elucidation of the teacher views on which groups were likely to be appropriate and relevant for the target population was a focus point at these meetings.

The main considerations when deciding on these four groups were:

- An appropriate number of groups. Not too many; not too few.
- Balance between serious groups and fun groups. Both should be available.
- Groups should be easily identifiable and understandable.

The activity in the four groups, in terms of messages, evaluations and comments, came to a total of 68. Not a big number, but still an indication of at least a basic level of activity. Further, during the interviews, the pupils expressed that they had actually visited the groups on a regular basis and they remembered the messages remarkably well. They just weren't submitting that many messages. The most popular group was "Visual Jokes".

Participants in the test were distributed over all four test schools and all together 10 pupils participated: 9 boys and 1 girl. The participants were chosen by the teachers from the group of pupils who already met the general HANDS criteria – well-functioning, aged 10-18, acceptable writing and reading skills. There were no formal requirements for prior SNS experiences but in the end all participants in the experiment turned out having this kind of experience. This related to the ethical concerns, expressed by the teachers, that involvement of participants with existing Facebook accounts was ethically less problematic, as it meant that the school was not actively introducing a new feature into their lives. However, the level of prior Facebook use varied significantly between users.

	Number of Pupils	Interviewed	Experience with FB
SVE	5	3	5
EGE	2	2	2
AF	1	1	0
HAS	2	2	2

Overview of pupils in the SPo

The interviews took place in a video conference system, Adobe Connect, which was not the optimal solution for individuals with autism. They were not familiar with such a media and the interviewer was new to them. Despite difficult conditions for the interviews –the

interviewer being a foreigner, interview taking place in a video conference system they had never accessed before - the interviews worked out well. School staff and interviewer made it possible to have good interviews and the results were good. Nevertheless, 2 pupils at one school were not able to attend.

The indication of prior experience with Facebook was based on their own perceptions of their experience, evaluation of their FB-profile and teachers opinion of their skills<sup>8</sup>.

From reviewing Facebook profiles of the participating pupils, we found that the most experienced Facebook users had a lot of Facebook friends (150-250), updated their profile on a regular basis, and used Facebook as a natural extension of their offline social network.

### **Experiment analysis**

The analysis of the all the data of the experiment will be carried out using three perspectives

1. Advantages
2. Friendship
3. Barriers

The analysis of the data was carried out by reading the profile of the pupils, looking at their Facebook profiles, reading their Facebook SPo activity and finally listening to the interviews once again.

### **Advantages**

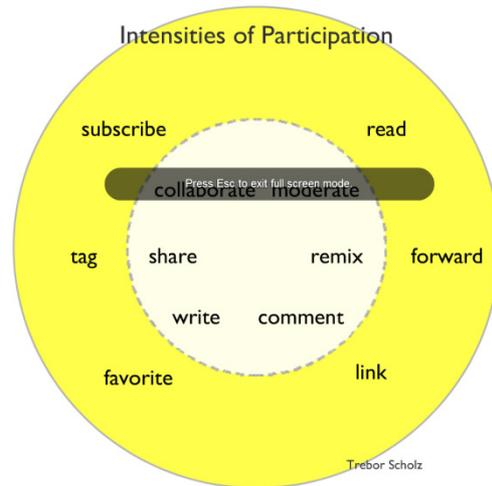
During the interviews, the pupils mentioned a number of advantages. One of the most significant was the fact that an SNS like Facebook is highly text orientated. One pupil explained how he got to learn Facebook "*...at first I was not able to be involved because of my poor writing skills, but I wanted to and I have improved my writing skills a lot since I started using Facebook four years ago*". Pupil N1

In general, these well-functioning pupils have learning difficulties and only a minority have reading and writing skills that are age equivalent. Another advantage of Facebook was that the learning curve could be adapted to the single individual. Most pupils mentioned that they used Facebook for chatting, staying in touch with friends and other social activities. The same pupils explained that they did not start out communicating. At first they were only playing games, but slowly the nature of the use changed.

The pupil adapted the learning curve in another manner. When using SNS you can participate in a number of ways.

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<sup>8</sup> Teachers opinion



### Trebzor Scholz: Intensity of participation in SNS<sup>9</sup>

The involvement needs not to be social interaction with anybody. It can be just monitoring what goes on - without anybody evaluating the pupil. In the case of the HANDS SPo the pupils weren't very active in an exposed manner, but during the interviews they expressed detailed knowledge about what was going on in the four HANDS SPo groups. This way pupils with ASD can observe social interaction in the SNS in this media that are new to them and the pace at which they get involved can be their own.

One advantage of a text-based SNS like Facebook was not an observation from the interviews. Being interviewed and being together with foreigners was definitely difficult for a number of the pupils. They did not feel comfortable with the situation, which is caused by the lack of ability to understand facial expressions and body language. A couple of pupils, who felt uncomfortable being interviewed, were on the other hand excellent and very active Facebook users, which could indicate that they benefit from a media without facial expression.

Finally, none of the pupils' Facebook profiles mentioned or indicated that the pupil had a diagnosis. None of the pupils were members of "autism" groups. None of the pupils expressed a desire to talk about how it is to be a pupil with ASD. The SNS made it possible for them to be like everyone else. Questioned explicitly, 2 pupils said that they knew of such groups, but did not find them interesting.

Obviously, all the advantages except the last one can be formulated as a barrier that the pupil has to manage. These are barriers that some pupils can overcome, whereas others can't.

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<sup>9</sup><http://www.slideshare.net/molodiez/motivation-for-participation-in-sociable-media>

## Friendship

Online development and maintaining of friendships is, as Malene Charlotte Larsen points out, different to offline development and maintaining of friendship. Online friendship makes use of the tools available: tagging, updates in profiles, announcements for friends about new statuses and events together with their SNS friends. The usage of the word “friend” has changed from being a specification of a close relation into someone you want to “be aware of”. The intensity of the friendship relation is depending on which kind of online exchange that takes place<sup>10</sup>. The social interaction is therefore a double challenge: the individuals with autism have trouble with friendships, empathy and social interaction, meaning that online development and maintaining of friendship definitely has to be taught. With all the interviewed pupils the pupil paid attention to the difference between online and offline friendship.

Generally speaking, all the pupils’ excerpts emphasized friends and communication with friends as very important. When asked what their major activity in the SNS was, they answered chatting with and being updated about the activities of their friends. But the pupils are distributed on a spectrum and some expressed a great attention to the difference. A well-functioning pupil, N2, told a story about an online meeting with a girl living in a city 4 hours away. But they managed getting to know each other and with the help of their parents ensuring that both partners were “real” and had sober interests and in the end they managed to meet. Another less well functioning pupil, N3, made a distinction between the FB friends. Those that he knew and those he did not know. The obvious conclusion is that FB friends for N3 are indicators of being like everyone else regardless of whether the numbers meant anything.

Another pupil, N4, was in a more challenging situation. The pupil simply didn’t have friends who were using an SNS like FB. Some pupils with autism are very “auto”, which means that they have few and weak relations to other humans. N4 had 4 FB friends, which makes the opportunity for socializing at the SNS very low. Such pupils exist and it is less likely that they will experience an SNS as a stream of messages, info and updates about friends and relatives.

Within the HANDS SPo experiment, there was very little success in bringing their own personal life story into the SNS. All pupils in the SPo experiment, without exception, were asked to write about themselves. Otherwise they would not have done it. The pupils were asked to post such a story, but the willingness and interest to focus on themselves were non existing. Studying their profiles, the majority of the participants did well at using FB’s tools

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<sup>10</sup>Malene Charlotte Larsen, Youth and Online Social Networking: A Nexus Analytic Study of Mediated Actions and Public Discourses\_p 175-180, [http://vbn.aau.dk/files/36940773/ph-d-afhandling\\_malene-charlotte-larsen.pdf](http://vbn.aau.dk/files/36940773/ph-d-afhandling_malene-charlotte-larsen.pdf) accessed October 2011

for “marketing” certain interests within sports, music or entertainment. The activity within the HANDS Visual Jokes Group was remarkably higher.

The pivotal point of their development and maintaining of friendships should not be their diagnosis or themselves. They searched for friendships and social groups in which their special interests are the pivotal point and in which they can involve themselves with neurotypicals.

## Barriers

The majority of what has been called advantages can, as already mentioned, be reformulated as barriers and there is no doubt that lack of fundamental communication skills, i.e. reading and writing, is a serious barrier for low function pupils with an autism diagnosis.

For vulnerable individuals with lesser skills, competences and resources, one barrier can be one barrier to much. The preferred safe position towards changes and new opportunities is rejection.

Only one participant, N4, had no prior experience in using an SNS like Facebook. N4 was the participant who met the larger barriers.

First of all, the visual complexity of a Facebook page is highly complex and confusing. Especially when compared to the visual pedagogical tools that are being used in autism pedagogy. Furthermore the interaction is difficult to recognize as action buttons or texts are not emphasized.



For Pupil N4 the consequence was that N4 had to be taught how to operate Facebook in hands-on sessions.

It is obviously a barrier that other less ICT experienced pupils will meet.

Another important barrier is the lack of friends using the SNS. It is obviously a strong motivation that the pupil gets messages, updates and more, just by having SNS-friends. The more messages and updates the better. The more SNS friends the better reason and possibility to train hands on operation.

The same pupil, N4, recognized another elementary barrier – the opportunity to access the internet. At home her parents had no internet connection and in school the access was limited.

Finally, one important barrier has to be mentioned despite the fact that it did not appear in the HANDS SPo experiment. Due to the lack of competences in social communication it may happen that pupils misunderstand the ones they communicate with. Continuously misunderstanding the other part while a conflict escalates can easily result in real aggression. Such cases are known by practitioners and theoretically fully understandable. Such a case did not arise during the HANDS SPo experiment, but schools, teachers and parents may be worried, with good reason, when introducing an SNS to all pupils.

This analysis shows that there are a number of advantages as well as barriers when pupils with ASD use an SNS. But unfortunately the variety of the population of high functioning pupils with ASD is remarkably high, and the ones who know which advantages and barriers are important, are the caretakers and relatives. For this reason, it is difficult to make general conclusions in this regard.

## **Conclusions**

It is time to return to the hypothesis mentioned in the first part of the HANDS SPo experiment.

We will discuss the hypotheses one by one.

### **Hypothesis 1**

*Young individuals with an autism diagnosis can benefit from being involved with Social Network Sites. They benefit by training and improving their ability to have friendships in an online setting, they benefit from training and improving their verbal skills.*

All the pupils in the test population were high-functioning pupils with ASD. The majority of the pupils definitely enjoyed using Facebook and they were able to train basic communication skills, they were able to improve their ability to socialise. They benefitted from the possibility to be observers or lurking and after a while try out a stronger involvement. They also benefitted from being integrated in an SNS used by neurotypical young people. They benefitted significantly from the variety of participation which enabled them to monitor communication as well as being involved. None of the pupils had experienced bad situations.

In terms of self-insight and self-awareness, none of the test pupils showed a desire for or an interest in using the SNS for such purposes. The profiles of the participants were filled with special interests and none of the special interests explicitly included self-insight or self-awareness. The same pattern was observed in the SPo groups “Personal Experiences”.

## Hypothesis 2

*Monitoring the young individuals with an autism diagnosis while using the Social Network Sites, can be beneficial for the caretakers and the pupils themselves. They benefit because conflicts can be avoided.*

The need for parental control does exist – not only for caretakers of autistic pupils – and there is a market for FB parental control programmes. Facebook itself has not created a specific type of user that includes parental control. However, some of the Facebook parental programmes are surprisingly easy to install. Unfortunately, the products are only in English, which makes them less useable for pupils whose native language is Danish, Hungarian or Swedish.

The HANDS SPo experiment offered this tool to the involved schools which again gave the offer to the involved pupils. None of the pupils were willing to be monitored in the HANDS SPo experiment, which is a quite understandable decision.

The HANDS SPo experiment cannot for these reasons confirm or reject this hypothesis.

## Hypothesis 3

*Using Social Network Sites requires that the young individuals with an autism diagnosis are heavily challenged. They are challenged in terms of their general poor reading and writing skills and in terms of their lack of friends that they can meet in SNS*

Some pupils in the test population are definitely challenged in an appropriate manner. They benefit a lot from their activity on the SNS.

Other ones who are in the same quartile of the autistic spectrum, well-functioning individuals, are heavily challenged. The main barriers are operation of the SNS and whether or not they have friends or relatives within the SNS who are able to involve them. The opportunities for observing or lurking are far less when the young people have few friends in real life. Another barrier was the access to the internet. Not all families can afford an internet connection at home and for this reason, some children will only have a few opportunities to use the SNS. This was the case at one of the schools.

Finally there is a risk of the challenge being too high regarding communication skills and social skills can be too poor in order to avoid misunderstanding and aggression. This has, however, not been observed in the HANDS SPo experiment.

#### Hypothesis 4

*Exchange of personal experiences at Social Network Sites among young individuals with an autism diagnosis can prove highly valuable.*

Judged by the test persons' Facebook profiles, except from one, they all have special interests that are suitable and is the driving force in being involved in a SNS. The test persons indicated no desire to make their diagnosis public. Most individuals have a poor self-esteem and therefore no desire to involve groups or discussions on an SNS about the lack of competences.

Such SNS exists for individuals with Aspergers syndrome but none of our test pupils indicated in the interviews, SNS activity or on the SNS profiles that they had such an interest.

### **Reservations & Final Conclusion Regarding the SPo**

These conclusions are based on a test group with 10 members. The test persons were selected by teachers and they did not, for ethical reasons, chose pupils that could have negative experiences. This meant that out of 10 members, 9 had success in using SNS. It is obvious to conclude that the involved test persons were among the most well-functioning among the well-functioning pupils with an autism diagnosis. The positive test result could have been mixed with one or more negative test cases due to lack of inner motivation or trouble interpreting the social interaction with escalation of conflicts as a result.

The general conclusion of the HANDS SPo test after the above reservation is that the test conclusions are positive – SNS can be a tool for training the pupils' social interaction in a media that the pupils are highly motivated to use.

The implementation of an SNS in schools follows the traditional advices in autism pedagogical methodology. Focus is on their special interest, awareness of potential conflicts due to the lack of social communication skills, and finally all pupils with an autism diagnosis are different and this solution may not work for all pupils despite the fact that they are categorised in a similar way.