Learning Together Apart – The Impact on Participation When Using Dialogic Educational Technologies for Kids with Attention and Developmental Deficits

Elsebeth Korsgaard Sorensen(✉) and Hanne Voldborg Andersen

Department of Learning and Philosophy, Aalborg University, Kroghstraede 3, 9220 Aalborg Oest, Denmark
{elsebeth,voldborg}@learning.aau.dk

Abstract. This study reports on research into the impact of digital technological interventions for including kids with attention and developmental deficits into school class contexts. It describes, how the authors have approached the challenge of researching inclusion of kids with attention and developmental deficits for communication, collaboration and knowledge sharing. The analysis assesses the potential of interventions with digital technology for acting as stimulating enzymes for life and learning. On the basis of a thorough discussion of the findings, the authors assess the degree to which interventions with digital technologies, e.g. Virtual Learning Environments (VLEs), may promote inclusion through stimulating the participation in life and learning of kids with attention and developmental deficits.

Keywords: Inclusion · Learning · Digital technology · Attention deficit · Dialogue · Interaction · Collaboration · Communication · 21st century learning skills · Thrownness · Hin enkelte · Learning together apart · Building identity · Participation

1 Introduction

The challenge, imposed by the Danish government in 2012, of including a higher proportion of learners with special educational needs in mainstream schools, represents a complex situation for educators. Many teachers are bewildered in terms of how to meet this increased challenge of inclusion. Generally, they do not find themselves "properly dressed" - educationally or technologically.

On the positive note, research on the educational potential and affordances of digital technologies [1, 2] has identified the *communicative affordance* of digital technology and networks as a strong and promising resource for teachers to employ in learning designs, provided the teachers, pedagogically and technologically, are able to utilize it. Much research [3, 4] points to the potential of digital technologies for supporting some of the ideas of what has been named "21st century learning skills": Creativity and innovation; Critical thinking, Communication and Collaboration.

A.L. Brooks and E. Brooks (Eds.): ArtsIT/DLI 2016, LNICST 196, pp. 264–271, 2017.
DOI: 10.1007/978-3-319-55834-9_31

The perspective of this study recognizes the potential of digital technological inventions to help teachers and learners with special needs to increase the feeling of *presence, participation and achievements* in teaching and learning processes [5] with focus on "Communication" and "Collaboration". These two modes involve a relation to other people and denote the idea that in order for a learning process to be of good *quality*, a learning process should incorporate - and utilize the digital technology to facilitate - these relations to the teacher and to other learners. In other words, the "glue" for these processes, namely *dialogue* and *interaction,* become central to the learning process. The dialogic affordances are prevailing in the set of reasons why digital technologies appear interesting as tools for helping the inclusion of a diversity of learners in mainstream schools. They offer a great potential in the hands of teachers as tools for helping the inclusion in mainstream classrooms of youngsters with developmental difficulties and difficulties in focusing attention [6].

Learners with attention and developmental disorders, such as e.g. Attention Deficit Hyperactivity Disorder (ADHD), Attention Deficit Disorders (ADD) and Autism Spectrum Disorders, are especially challenged, when it comes to *participating in processes of dialoguing and collaboration*. In general, the achievements of this group of learners are marked by low productivity, errors due to lack of procedures and a poor ability to organize [7].

In addition to general learning disabilities, the attention deficit expressed by insufficient memory, poor persistent focus and initiation ability might affect the ability of the focus learners *to participate* and contribute in collaborative knowledge construction and task solving (ibid.). Furthermore, potential hyperactivity and impulsivity may give rise to inappropriate behavior, disturbances and lower tolerance among the focus learners themselves and their peers [8].

In sum, there appear to be an extensive need for developing digitally based pedagogical methods to stimulate focus learners to co-enact, to dialogue and to collaborate and through these processes learn to fill in the role at school as a significant and valued *peer and participant* in processes of life and learning.

Section 2 of this paper outlines the analytical optic, on which the analysis of this piece of research is resting. Section 3 gives an account of the research design behind the study. It describes, how the authors have approached the challenge of researching the need of the focus group for communication, collaboration and knowledge sharing, and it assesses the potential of digital technology to act as a positive contributor in this respect. While Sect. 4 forms the forum for the actual analysis and the actual insight into data, Sect. 5 performs a more thorough discussion of the findings. Section 6 makes an attempt to assess the degree to which it appears possible to make conclusions on the basis of these findings.

2 Analytical Optic

In the following paragraphs the authors draw the contours of some of the underlying philosophic assumptions and theoretical *concepts of quality*, through which the authors try to capture and discuss the data and findings of this study in view of the challenge of inclusion.

2.1 Developing Identities Together Apart

Any individual human being is unique (an exception) and need space to develop as such. But at the same time, this unique human is preconditioned upon a condition of inescapable co-existence or "thrownness" [9], in which *relations* with other people (social, communicative and otherwise) come into focus, in order for a human being to develop harmoniously throughout a lifelong learning process. Envisioning focus learners to become included as happy and well-functioning human beings as any world citizen ("dannelse"), the authors find the notion of "hin enkelte" [11] as one fruitful perspective of a focus learner: [*(…) in a certain understanding every human being constitutes an exception, and that it is true that every human being is the universally human and, in addition, an exception" (Kierkegaard, 1843)] (Our translation).* Thus, a prosperous process of inclusion aligns with the notion of "a genuine learning process", which emphasize genuine learning as something, not only *meaningful* to the learner, but also *true* to the learner [12].

This view of a learner (i.e. a participant in a learning community) entails the idea of *identity through participation*, and implies that in every learning act and communication, the individual must arrive at *experiencing him or herself as something unique* - an exception. This means that all individuals are left, ultimately, with the important task of participating and, thus, working on the creation of their identity in "becoming themselves".

Thus, any pedagogical approach and use of technology must necessarily employ the digital technologies in ways being concerned with personal growth and a confirmation of the value of "hin enkelte" [11]. At the same time, the digital technologies and interventions must be employed to promote a learner experience of inclusion, and a feeling of being recognized as a valuable participating and contributing member of a group of peers sharing an inescapable context of mutual collaboration, dialogue and collaborative knowledge building (CKB) - in a spirit and context of "learning together apart"[1] [13].

2.2 Developing Participation and Empowerment

Language use and collaborative dialogue (CKB) are widely acknowledged as fruitful pedagogical elements in a prosperous learning process. Both our natural language and any dialogue unfolding around an issue may be viewed as "media" for learning. They underpin the double optic of the ying-yang relationship between "hin enkelte" (individual) and "co-existence" (collaborative) in the learning process. Instead of aiming at making learners reproduce knowledge (traditional pedagogy), the CKB process allows for participation in a continuous "construction of NEW knowledge" [14] through dialectical pending between involvement and reflection [10].

[1] This term was first coined by Dr. Tony Kaye, in Kaye, A. W. (1992). Learning Together Apart. Heidelberg:Springer. The meaning of the term has been slightly altered in the present context to cover the combination of "learning intra-personally" and "learning inter-personally" (with peers).

Dialogue is considered vital for *learner empowerment* to be cultivated. Employing dialogue in a learning process is widely recognized as a fruitful method for the individual learner to be joining and participating the choir adding voice to the polyphonic symphony of the classroom [15, 16]. The *teacher is the key and pedagogic architect* of creating the polyphonic classroom [16] and for making diversity and variation resources among students, in the "symphony of learning" unfolding in an including classroom.

To become *included and (co-)exist* in a global world calls for abilities and competencies to respectfully negotiate diversities and invite compromises - competencies to dialogue with others, while respecting the voice and the value of the argument. Thus, while the making ("Bildung") of democratically oriented global citizens takes its point of departure already in the implementation of educational digital methodology, it plays a significant role in the education and self-understanding of the global citizen, as it promotes … *learning to dialogue* [17].

Teaching for growth in a digital 21st century context is envisioned to include two overall societal needs related to two overall pedagogical focuses: (1) supporting the *individual aspect of learning,* and (2) supporting the *co-existential aspect of learning*. Thus, teachers' pedagogies, when using digital technologies and technological interventions for inclusion, must include pedagogical methods that support:

- development of *an individual learner identity* (i.e. "hin enkelte")
- initiative and *ownership* of the individual learner
- co-construction of *new and (to the learner) true knowledge* [12]
- *visibility and respect* for *participation/contribution* to the community
- *collaborative knowledge building dialogue (CKB)* [1]

How can technology and technological interventions be utilised to enhance this approach with our focus learners? In which situations does it occur in the case study?

3 Research Design

This piece of research is one of the outcomes from a wider research design [7, 18, 19]. "Ididakt is an iterative and explorative qualitative research project, where data is collected in a real school context. It is a case study in the frame of Action Research (AR) and Educational Design Research (EDR) [20] using a hermeneutical, phenomenological interpretation of data. It is crucial for our data collection, that the unfolding research process goes hand in hand with the involved teachers' work and interventions into the field of study, so the process becomes a learning endeavour in terms of learning how to work with SEN learners and integrating ICT in the classroom" [18].

"Therefore, we designed this study using an AR/EDR approach, where the researchers are included as participants – and professional dialog partners and facilitators of the transformation processes – at the schools involved: 11 schools where 46 teachers in 26 classes have experimented with and examined the impact of including ICT facilitated interventions with more than 500 learners aged 6 to 16 years – including 56 learners with extensive developmental or attention deficit disorders (focus learners). We are studying the problem in its real life context: the mainstream classroom, where

the borders between phenomenon and context are unclear. We have collected data from teachers' statements at seminars, in research blogs, from interviews, and from surveys and observations in the classroom, and we analyse and compare the data in a data triangulation" [7].

4 Analysis and Findings

During the project work 16 out of 26 classes (62%) in 8 out of 11 schools (73%) with Google Apps for Education (GAfE) as Virtual Learning Environment (VLE). We are to some extend able to observe, where and how this technology is utilised to enhance the focus points above, and which impact the use of the VLE has to our focus learners. As a part of our analysis, the eight schools are divided into three categories compared to the learners' experiences as respectively expert, competent or novice when using the GAfE technology.

4.1 The Expert Level (Two Classes - 11% of the Schools)

Students at one of the schools mastered GAfE at a high level and employed the VLE in almost all learning activities. Both teachers and learners were experts, when it came to applying the technology. We observed a pedagogically and technologically powerful team of teachers, who in two years had developed a teaching and learning practise for using GAfE as VLE in two classes in level 6th grade. We noticed on-going pedagogical meta-reflections about the value of this technology for focus learners.

The same school utilised Google Websites as a shared digital academic portfolio. Each subject had its own website, and the full academic repertoire over time was compiled here. This was the place where focus learners found texts, tasks set by the teachers, learner assignments, information, analysis models etc. As a main rule, each learner had access to everybody's assignments and notes. The learners had a school account at GAfE containing mailbox, calendar, drive etc., but apart from that they used many online tools (e.g. mindmeister, quizlet, padlet) to complement the Google applications (docs, sheets, slides etc.).

In this pedagogical setting we were witnessing that focus learners were part of a *shared knowledge building* community, where learners were *dialoguing* about academic topics. All learners' *participation and contributions* were *visible and operationalized* in the design at the Google site and the structures at the Google Drive. Learners were *collaborating* in their problem solving; they were inspired of each other's work and discussed possible solutions of their tasks. The Google Site and Drive may be interpreted as reifications of the knowledge they had *jointly* created. It appeared an externalised part of the learners' academic *identity*, and the focus learners expressed *ownership* to their own as well as to the entries of their peers. Furthermore, in addition to this shared open portfolio, each learner had an individual portfolio, where he/she summed up his/her own 'view of the case' – or his/her own "*true knowledge*"; e.g. in math at their 'word of wisdom site' or in linguistics at their 'concept understanding site'.

Focus learners found much help in this pedagogical design. They were supported in *participating* via the *visible* structure, the *jointly generated content* and the *collaboration with peers*. Insecure focus learners retrieved inspiration, certainty and affirmation at the VLE. We observed, how focus learners felt proud of the shared products – even though their participation in the task solving, in fact, had been peripheral. But we observed, too, how the focus learners may feel so vulnerable or have so much to offer in the task solving processes (e.g. due to developmental delay) that it becomes difficult for them to participate, openly and equally.

4.2 The Competent Level (4 Classes - 33% of the Schools)

For the students at three schools GAfE is well known, and they use the VLE for many of their learning activities. Both teachers and learners are competent and apply technology fluently. We have observed a team of teachers that – to some degree – mastered the technology and were accustomed to using it with their students in, respectively, two classes in 2nd grade and two classes in 6th grade. We only noticed few pedagogical meta-reflections on the value of this technology for learners with special educational needs.

These schools primarily utilised Google Drive and Google applications as management tool in the learning processes. The teachers established folders for each subject and sub-folders for the topics, in which files related to the task solving were shared. Focus learners received files in writing protected folders and copied them to their own drive. They collaborated on Google applications (docs, sheets, slides, hangout) during their task solving. One of the schools started using Google Classroom as a compiling VLE.

In this pedagogical setting we noticed that learners had opportunity to *collaborate* and *foster new knowledge*, primarily, through shared writing processes in Google Applications. It happened mostly at task level and in the form of occasionally *shared knowledge building*; only one of the schools attempted to *organize and visualise* the academic content and the learners' contributions in Google Classroom. The *participation* was more individualised, and the *digital dialogue* took place between teacher and each learner, rather than in an open *shared dialogue* among all learners. The *shared writing processes* were aiding focus learners. They were supported in keeping attention and be aware in the task solving process by *dialoguing and collaborating* with peers. Finally, we noticed, how this pedagogical design demanded a clear and visible distribution of roles in the work-sharing processes (as e.g. Collaborative Learning (CL) methods), to avoid focus learners leaving the work to their peers.

4.3 The Novice Level (10 Classes - 56% of the Schools)

GAfE was unknown to the students at the last five schools, but they started using it in the project in some of their learning activities. The learners were novices, while the teachers ranged from novice to expert. There were two different teams of teachers. At one of the schools (three classes in 3rd grade) teachers were experts, given that they had previous experiences with using GAfE as a VLE. At four schools teachers had to pick up digital skills simultaneously to putting the technology in operation in two classes in

1st grade, one class in 4th, two classes in 7th grade and two classes in 10th grade. We noticed incipient pedagogical meta-reflections concerning the value of this technology for learners with special educational needs.

These schools started using Google Drive and Google applications as tools for learning. The teacher gained experiences in creating and sharing folders and stumbled in general over some difficulties related to fostering an appropriate structure for the learners (with the exception of one school). The learners collaborated in Google applications (docs, sheets, slides, calendar) and learned how to use assistive technologies (text to speech) at GAfE. One school tried out Google+ as a social learning environment.

5 Discussion

In this pedagogical setting we noticed how easily focus learners fell short, when the virtual learning environments were lacking intentional management and structure. But at the same time we observed, how teachers at expert level were able to facilitate academic and work-related success for both focus learners and peers, due to the fact that they used their knowledge about GAfE to introduce and scaffold learners in relation to the technology in a well-arranged step-by-step pedagogical approach.

Focus learners need visual support systems to remember how to navigate in a new online universe. It is necessary to produce recognisable structures across subjects and to stimulate focus learners in growing accustomed to the VLE. We have observed, how focus learners' participation in production and dialogue increase considerably, when they are working with digital templates (e.g. Google Docs or Slides), which guide them through the task solving processes.

6 Conclusion

This paper has addressed the impact of digital technology and technological interventions for including kids with attention and developmental deficits into school class contexts. It has described, how the authors have approached the challenge of researching inclusion of kids with attention and developmental deficits for communication, collaboration and knowledge sharing. On the basis of a thorough analysis of the findings, the authors have discussed how technology and technological interventions promote inclusion through stimulating participation, digital dialogue, and collaborative knowledge building of NEW knowledge, primarily through shared writing processes in Virtual Learning Environments.

The major finding of the study suggests that *teachers and the degree of their pedagogical and technological insights and competences* appear to be the key to inclusion of focus learners. It also uncovers that many teachers need more educational support and competence development. – But to receive more educational support and learning for themselves, they need to be given sufficient space and time to participate and learn together through participating in collaborative knowledge building dialogue. As for our focus learners, it counts for the learning of the teachers that the quality of their learning process will increase through collaborative knowledge building in a setting of "learning together apart".

References

1. Sorensen, E.K.: Dialogues in networks. In Andersen, P.B., Holmqvist, B., Jensen, J.F. (eds.) The Computer as Medium, pp. 389–421. Cambridge University Press, Cambridge (1993)
2. Sorensen, E.K., Takle, E.S., Taber, M.R., Fils, D.: CSCL: structuring the past, present and future through virtual portfolios. In: Dirckinck-Holmfeld, L., Fibiger, B. (eds.) Learning in Virtual Environments. Samfundslitteratur, Frederiksberg (2002)
3. Weigel, V.B.: Deep Learning for a Digital Age: Technology's Untapped Potential to Enrich Higher Education. Jossey-Bass, San Francisco (2002)
4. Dalsgaard, C., Sorensen, E.K.: A Typology for Web 2.03. In: Proceedings of European Conference on E-Learning (ECEL 2008), pp. s.272–s.279 (2008)
5. Ainschow, M., Booth, T.: Index for inclusion developing learning and participation in schools. http://www.eenet.org.uk/resources/docs/Index%20English.pdf. Accessed 15 Aug 2015
6. Andersen, H.V.: Supporting inclusion of learners with attention deficit hyperactivity disorder in sound-field-amplification-systems. In: Sorensen, E.K., Szucs, A., Khalid, S. (eds.) Proceedings of the 1st D4lLearning International Conference: Innovations in Digital Learning for Inclusion, pp. 1–8. Aalborg Universitetsforlag (2015)
7. DuPaul, G.J., Stoner, G.: ADHD in the Schools: Assessment and Intervention Strategies, 2nd edn. Guilford Press, New York (2003)
8. Almer, G.M., Sneum, M.M.: ADHD - Fra barndom til voksenalder (1. udgave, 2. oplag). Frydenlund, København (2009)
9. Heidegger, M.: Sein und Zeit. Max Niemeyer Verlag, Tübingen (1986)
10. Kierkegaard, S.A.: Enten - Eller. Gyldendahl (1843)
11. Colaizzi, P.F.: Learning and existence. In: Valle, R., King, M. (eds.) Existential-phenomenological alternatives for psychology, pp. 119–135. Oxford University Press, New York (1978)
12. Kaye, A.R.: Learning together apart. In: Kaye, A.R. (ed.) Collaborative Learning Through Computer Conferencing. Springer, NY (1992)
13. Darsoe, L.: Innovationspaedagogik. Samfundslitteratur, Copenhagen (2011)
14. Ó Murchú, D., Sorensen, E.K.: Online master communities of practice: collaborative learning in an intercultural perspective. Eur. J. Open Distance Learn. **2004/I**, 1–9 (2004) (Peer Reviewed)
15. Dysthe, O.: The multivoiced classroom. Interactions of writing and classroom dialogue. Written Commun. **13**(3), 385–425 (1996)
16. Sorensen, E.K.: Fostering intercultural collaborative learning (i-CSCL) through problem orientation methodology (POPP) and social media. Published in METJ (2012)
17. Andersen, H.V., Sorensen, E.K.: Technology as a vehicle for inclusion of learners with attention deficits in mainstream schools. In: Expanding Learning Scenarios - Opening Out the Educational Landscape, pp. 720–730. European Distance and E-Learning Network (EDEN), Barcelona (2015)
18. Sorensen, E.K., Andersen, H.V., Grum, H.: Intercultural Dialogic eLearning: a tool for fostering shared understanding and sustainable competence development in practices of inclusion. In: Herrington, J., Couros, A., Irvine, V. (eds.) Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2013, pp. 389–397. AACE - Association for the Advancement of Computing in Education (2013)
19. Jungk, R., Müllert, N.R.: Håndbog i fremtidsværksteder. Politisk revy, Copenhagen (1989)
20. McKenney, S., Reeves, T.C.: Conducting Educational Design Research. Routledge, NY (2012)