Executive Summary

Assistive technologies (AT) are specialised products designed for people with special educational needs and disabilities. This stakeholder report describes the findings of the rapid literature review relevant for researchers.

Additional stakeholder reports for administrators, developers, educators, and policymakers can be found at https://www.knowledge-by-design.com/ukat/

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Introduction

1 The Department for Education’s Education Technology Strategy, Realising the Potential for Technology in Education, described 10 EdTech Challenges designed to catalyse activity in specific areas of the EdTech sector in ways that are aligned to the needs of teachers and students. One of these challenges focuses on needing to identify the best technology that helps level the playing field for learners with Special Educational Needs and Difficulties (SEND).

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2 In order to meet this challenge it is necessary to understand the current landscape of assistive technology (AT) used in education and what impact they have on outcomes for students with special educational needs and disabilities (SEND). To this end, a rapid review of the literature on assistive technology (AT) in education was conducted over a ten-week period in February – April 2020. A final report from the project describing the findings is available for download.

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Rapid Literature Review on Assistive Technology in Education http://www.knowledge-by-design.com/ukat/

3 The purpose of this stakeholder report is to provide administrators with insights about the use of AT in educational settings in order to facilitate the effective delivery of AT devices and services for pupils and learners with special educational needs and disabilities. Interested readers are encouraged to visit the project web site to query the interactive data set or contact the Principal Investigator with questions or requests for custom searches of the knowledge base.
What is Assistive Technology (AT)?

4 The World Health Organization describes AT as follows:
- Assistive technology is an umbrella term covering the systems and services related to the delivery of assistive products and services.
- Assistive products maintain or improve an individual's functioning and independence, thereby promoting their well-being.
- Assistive technology enables people to live healthy, productive, independent, and dignified lives, and to participate in education, the labour market and civic life. Assistive technology reduces the need for formal health and support services, long-term care and the work of caregivers. Without assistive technology, people are often excluded, isolated, and locked into poverty, thereby increasing the impact of disease and disability on a person, their family, and society.

5 Over a lifetime, each of us will experience situations in which we personally, or, someone we know, will encounter limitations due to aging, disease, accident, or disability, that will impact the ability to perform basic life functions such as hearing, seeing, self-care, mobility, working, and participating in education. Whereas some of us may be born with a disability or disease that will require us to overcome limitations throughout our life, others will need to learn how to respond to challenges that arise from an accident or limitations that arise from simply growing older. As a result, AT has the potential to impact everyone, either directly as a personal user of AT, or indirectly, as a means of helping someone we know.

6 Realising the potential of technology in education involves maximising the application of assistive technologies to enhance academic, behavioral, social, and economic benefits.
of pupils and students with special educational needs and difficulties. Historically, pupils and students with special educational needs and disabilities have had difficulty accessing the general education curriculum. This means they have been unable to achieve the same benefits from instruction as their peers.

7 The essence of assistive technology involves finding appropriate tools that enhance the functional performance of a person with a disability to complete routine tasks that are difficult or impossible. The magnitude of this task is not insignificant as there are over 25,000 assistive technology devices. When a person finds the appropriate AT, they are able to complete tasks that they previously could not complete, did slowly, or did poorly. The right AT augments, bypasses, or compensates for a disability.

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AbleData
https://abledata.acl.gov/

Special Educational Needs

8 Disabilities manifest themselves in many different forms and severities. As of January 2019, 1.3 million (14.9%) of all pupils in England have special education needs.

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Special Educational Needs in England: January 2019

9 Whereas the impact of a disability should always be considered on an individual basis, there are general domains of functioning that are affected by a disability (see Table below). Developers interested in a specific disability category are encouraged to focus on a particular row to understand the relevant applications of AT. Developers interested in a specific domain of functioning relative to AT are encourage to explore the table columns to understand the various groups that may benefit.
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<th>Disability</th>
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The value and significance of assistive technology can be understood in relation to performance problems. That is, a person with a disability encounters a task they are unable to successfully complete. Following the identification of an appropriate assistive technology device, acquisition of the product, training and support in its use, a person is subsequently able to complete the same task that was previously difficult or impossible. As a result, assistive technology devices and services enhance the performance of individuals with disabilities by enabling them to complete tasks more effectively, efficiently, and independently than otherwise possible. As researchers explore AT devices they must also be mindful of measuring the influence of AT services.

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Coleman, M. B. (2011). Successful implementation of assistive technology to promote access to curriculum and instruction for students with physical disabilities. Physical Disabilities: Education and Related Services, 30(2), 2-22.


The Importance of Theoretical Frameworks for AT

The importance of theoretical frameworks for AT cannot be underestimated for developing a conceptually sound AT research base. Several models can be found in the literature, including: Assistive Technology Service Method (ATSM), Human, Activity and Assistive Technology (HATT), Matching Technology with Person (MTP), as well as Student, Environment, Tasks and Tools (SETT). Yet, far too many research studies are published without a theoretical framework which diminishes the cumulative value of the knowledge base for answering fundamental questions about access, engagement, motivation, performance, and more.
There are very few instruments for measuring the implementation of AT devices and services or measuring the outcomes of AT. Whenever possible, researchers are encouraged to replicate instruments used in previous research. Significant work is needed in this area to develop instruments that have sound psychometric properties.
At this time, only a small number of AT interventions can be documented as having a moderate or strong evidence base. This finding, within the context of a rapid review of the literature study, is congruent with previous AT evidence synthesis reviews. The overall level of evidence concerning the effectiveness of AT is generally low because most primary studies have methodological limitations (e.g., insufficiently powered research designs, small numbers of subjects, inadequate descriptions of participants’ functional limitations and/or the study contexts, inadequate attention to reporting effect sizes and the confidence intervals of the observed changes). Resolving these issues will take concerted efforts by researchers, journal editors, and reviewers to apply evidence
standards when judging the publication worthiness of new research studies.

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Highest Quality Evidence Concerning AT Outcomes

The results of this rapid review of the AT literature discovered 24 studies that were coded as a systemic review or meta-analysis with effect sizes or evidence obtained from at least one well-designed randomized clinical trial (RCT). These works represent the highest-quality evidence to-date concerning the outcomes of AT.

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Learn More (continued)


Learn More (continued)


Exemplary AT Methodological Studies

Researchers may be interested in exploring several exemplary studies in order to gain new insights about research methodologies. (The following list is by no means comprehensive. These studies are merely suggestive of new approaches to research, development, and dissemination.)

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Sometimes researchers include development work as part of their research studies. In order to produce AT products that meet the needs of people with special needs and disabilities, best practice indicates that it is essential to involve potential users in the iterative design process. It is not appropriate to test AT products on able-bodied people asking them to simulate a disability. Increasingly, children are being engaged in the design of new technologies.

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AT Researchers may wish to explore methodologies associated with design research as an approach to agile development while simultaneously collecting user data about the need and function of the new product to obtain social validity data.

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Learn More (continued)

