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Action Research and Empowering Users in Assistive Technology in Malawi; Protocol for the APPLICABLE project

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4 Action Research and Empowering Users in Assistive Technology in Malawi; Protocol for
5 the APPLICABLE project
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For peer review only

Abstract

Introduction

Assistive Technology (AT) is important for the achievement of the Sustainable Development Goals (SDGs) for persons with disabilities (PWD). Increasingly, studies suggest a significant gap between the need for and demand for and provisions of AT for PWD in low- and middle-income settings. Evidence from high income countries highlights the importance of robust AT policies to

1
2
3 the achievement of the recommendations of the World Health Assembly on AT. In Malawi, there
4
5 is no standalone AT policy. The objectives of the priority Assistive Product list Implementation
6
7 Creating Enablement of inclusive SDGs (APPLICABLE) project, are to propose and facilitate the
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9 development of a framework for creating effective national Assistive Technology (AT) policy and
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11 specify a system capable of implementing that policy such policies in low-income countries such
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13 as Malawi.
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18 Method and analysis

19
20 We propose an action research process with stakeholders in AT in Malawi. APPLICABLE will
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22 adopt an action research paradigm, through developing a shared research agenda with
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24 stakeholders and including users of AT. This involves the formation of an Action Research Group
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26 (ARG) that will specify the priorities for practice - and policy-based evidence, in order to facilitate
27
28 the development of contextually realistic and achievable policy aspirations on AT in Malawi and
29
30 provide system strengthening recommendations that will ensure that the policy is
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32 implementable/implemented for their realization. We will undertake an evaluation of this policy by
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34 measuring supply and support for specific AT prior to, and following the implementation of the
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36 policy recommendations.
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43 Ethics and Dissemination

44
45 The Maynooth University Research Ethics Committee approved the study protocol (SRESC-2019-
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47 2378566) while ethical approval is being awaited from the University of Malawi Research Ethics
48
49 Committee. Findings from the study will be disseminated by publication in peer-reviewed journals,
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51 presentations to stakeholders in Malawi, Ireland, and international audiences at international
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53 conferences.
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6 **Keywords:** Action Research, Assistive Technology Policy, Assistive Product List, Collective
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8 Leadership, Malawi
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10 11 12 13 14 **Strength and Limitations of this Study** 15

- 16 ➤ This study will be the first in Africa to explore the development of a national Assistive
17
18 Technology policy and Assistive Product list in response to the recommendations of the
19
20 WHO.
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- 23 ➤ The framework developed from this study, will lead to strengthening of the Assistive
24
25 Technology ecosystem in Malawi and may be relevant in other countries with similar
26
27 interest.
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- 30 ➤ Using an emergent and action learning approach strengthens both the methods and
31
32 reflexivity of the research process and ensures active participation of all stakeholders.
33
34
- 35 ➤ The use of a flexible research methodology may lead to researcher bias and deviation from
36
37 the initial objectives may occur on account of the reliance on the contribution from multiple
38
39 stakeholders.
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41
- 42 ➤ The proposed principle of collective leadership may be a hard sell to the stakeholders in
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44 government who are used to the traditional single ministry lead in policy development.
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Introduction

Persons with disabilities (PWD) often experience overt and covert barriers to participation in society and exercise of their rights.¹ These experiences of deprivation have dire implications for PWD, depending on their location and type of impairment. This realization has led to various efforts at both national and international level to ensure the reduction and elimination of the deprivation experience by PWD.^{1, 2} The United Nations Convention on the Rights of Persons with Disabilities (UN CRPD) and the Sustainable Development Goals (SDGs) emphasize the importance of inclusion for PWD.^{3, 4} The SDGs highlight the importance of social inclusion through the slogan- 'leave no one behind'.

Assistive Technology (AT) is pivotal to achieving this mandate of inclusion of PWD.^{4, 5} AT is a 'subset of health technology and systems refers to "the development and application of organised knowledge, skills, procedures, and policies relevant to the provision, use, and assessment of assistive products".⁶ while an assistive product is "any product (including devices, equipment, instruments, and software), either specially designed and produced or generally available, whose primary purpose is to maintain or improve an individual's functioning and independence and thereby promote their wellbeing".⁶ Common examples of assistive products in different impairment domains include wheelchairs, white canes, hearing aids, communication boards and calendar pill boxes. In 2014, the WHO established the Global Cooperation on Assistive Technology (GATE) in order to address the global need for AT.⁷ One of the first tasks for GATE was to establish a Priority Assistive Product List (APL)⁸ which called for countries to develop their own context specific national APL, similar to the WHO

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3 Essential medicines list.⁹ The APL is not restrictive but a guide provided by GATE for countries
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6 to use in identifying national AT needs and priorities.⁸
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10 In a bid to improve access to AT , GATE recommended five priority (5Ps) themes, namely people,
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12 policy, products, provision and personnel.⁸ That schema put *people*, or users of AT, at the centre
13
14 and policy, products, provision and personnel, as strategic points of action to improve access to
15
16 AT around the world. In a series of position papers from the Global Research, Innovation and
17
18 Education on Assistive Technology (GREAT) summit organized by GATE, people were identified
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20 as important drivers in AT access;¹⁰ context sensitive products were considered relevant for AT
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22 accessibility;¹¹ the development of an international standard for provision of AT was seen as
23
24 important for service user safety,¹² and the certification of competency for AT personnel as
25
26 important for staff training,¹³ along with an inclusive development of national AT policies, all to
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28 improve access to AT.¹⁴ Along with these papers, an additional 5 Ps – specifically referring to the
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30 context of AT services were also identified as emergent from the discussions at the Summit (see
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32 Figure 1)
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42 **Figure 1: The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan**
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44 **& Scherer, 2018, with permission)**
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49 Stermann suggests that it is not a lack of resources, technical knowledge or commitment that
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51 prevents us from making improvements in public health services but rather, “What thwarts us
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53 is our lack of meaningful systems thinking capability”.¹⁵ Specifically in relation to AT,
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3 MacLachlan and Scherer argue that “a systems thinking approach allows for a meaningful
4 linking of components and processes, a more realistic understanding of why and where
5 initiatives might fail or succeed, and a more satisfying way of placing the user of assistive
6 technology at the centre of ideas, activities and outcomes.”¹⁶
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15 The Malawi Context

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17 Increasingly, studies suggest low demand and provision of Assistive Technology (AT) for
18 PWD in low- and middle-income settings.¹⁷ Malawi is a Southern African country with a
19 population of about 18 million. The economy is largely agrarian, and the government depends
20 on foreign aid. Malawi ranks 172 out of 189 countries based on the United Nations Human
21 Development Index.¹⁸ In Malawi, there are several policies and strategies at the national level
22 which are relevant to the experiences of PWD, each which should have relevance to AT.
23
24 Notably, the National Policy on the Equalization of Opportunities for PWD¹⁹ and National
25 Disability Mainstreaming Strategy and Implementation Plan,²⁰ yet there are no clear direction
26 guidelines on how AT should be provided in the country²⁰. It is pertinent to state that the
27 National Policy on the Equalization of Opportunities for Persons with Disabilities was adopted
28 in 2006; and processes are under way to develop a successor plan on account of its expiration.
29
30 In Malawi, there is a huge gap between the need and access to services PWD.²¹ Although
31 about 69% of PWD need assistive devices in Malawi, only 5% have access to them.²²
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33 Evidence from high income countries highlights the importance of robust AT policies for the
34 achievement of the recommendations of the WHA on AT.²³ In Malawi, there is no standalone
35 AT policy.²⁴
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6 The objectives of the Assistive Product List Implementation Creating Enablement of inclusive
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8 SDGs (APPLICABLE) project are (i) to propose and facilitate the development of *a framework*
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10 for creating effective national Assistive Technology (AT) policy and (ii) *specify a system*
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12 capable of implementing that policy in Malawi.
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16 Methods and Analysis

17 Approach

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19 The study will adopt an action research approach²⁵ and shared research agenda in
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21 collaboration with AT stakeholders in Malawi to achieve the study objectives. Hence, this
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23 research protocol is based on a proposed research plan by the research teams at Maynooth
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25 University and the University of Malawi and the discussions held during the project launch and
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27 formation of an Action Research Group (ARG) in Malawi.
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31
32 The relevance of action research for solving persistent problems has been extensively
33
34 reported.²⁵ Boger et al recommend collaborative transdisciplinary approach for solving
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36 persistent problems in AT.²⁶ In adopting this method, we aim to ensure that the process of AT
37
38 policy development is participatory, collaborative and undertaken through a transparent and
39
40 reflexive process with relevant stakeholders in Malawi. Equally essential is the relevance of
41
42 the action research paradigm to the systems-thinking and mission-oriented approach which
43
44 are central to the objectives of APPLICABLE. A systems thinking approach will ensure
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46 APPLICABLE focuses on the range of Ps (described above) to bridge the AT systems Gap in
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48 Malawi.^{16, 27} 'Collective leadership' will be a guiding principle for the research, whereby all the
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50 participating ministries and other major stakeholders, take active leadership in the project in
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52 order to engender collective impact which is supported by research. According to De Bruin et
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3 al., collective leadership was associated with improved communication and role clarity, greater
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5 willingness to adopt leadership roles and 'give and take' by leaders, who became more willing
6
7 to share leadership responsibilities.²⁸ Also, Michaud-Létourneau suggest that the approach is
8
9 useful for changing policy where many stakeholders exist.²⁹
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15 The specific research methods described below are tactical and will be decided by and with the
16
17 ARG in an iterative process through a series of phases, each comprised of Action Research
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19 Cycles. The content for each of those action research cycles will be decided in consultation with
20
21 key stakeholders in AT in Malawi through the formation of an Action Research Group (ARG). The
22
23 five phases of the research are Preparatory Work, Policy Development, Systems Development,
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25 Implementation and Evaluation, and Knowledge Exchange (Figure 2).
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34 **Figure 2: APPLICABLE research phases**

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39 **Formative Research**

40 As part of the formative research process, Initial meetings were held with the Ministries of Gender,
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42 Children, Disability and Social Welfare (MoGCD&SW), Health, Education, and Labour, Disabled
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44 People's Organisations, other civil society, service providers, donors, industry and UN agencies.
45
46 Presentation and discussions on establishing a AT policy and implementation systems in Malawi
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48 were discussed and the stakeholders expressed interest in the project.
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51 The project launch was held on the 6th of December 2019 with over 40 stakeholders drawn from
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53 five broad stakeholders groups namely:
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- 4 1. Government Stakeholders (e.g. Ministries of Health, Education, Gender and Persons with
- 5 Disabilities and the Elderly)
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- 7
- 8 2. Non-governmental non-profit stakeholders (e.g. Federation of Disability Organization in
- 9 Malawi (FEDOMA), and Beit Cure International Hospital (BT) Malawi Council for the
- 10 handicapped (MACOHA))
- 11
- 12
- 13 3. Non-governmental for-profit stakeholders (Pharmacist, Physiotherapist)
- 14
- 15
- 16 4. Academic Institutions
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- 18
- 19 5. United Nation agencies (e.g. UNICEF, WHO, UNDP)
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25 Following the project launch, 15 persons were invited from the stakeholders present to join the
26
27 ARG.

28
29 The ARG adopted the proposed process and agreed that:

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- 31
- 32 • A realistic AT policy and delivery system is needed in Malawi.
- 33
- 34 • That ownership of the policy will be further discussed and that initially it will be co-led by
- 35 members of the Action Research Group.
- 36
- 37
- 38
- 39 • Data will be stored at the Centre for Social Research, Malawi.
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- 41

42 The launch was organized in collaboration with Clinton Health access Initiative (CHAI) who
43 previously conducted a baseline survey on AT in Malawi. They presented the results on their
44 survey after which APPLICABLE was introduced by the Principal investigators from Malawi and
45 Ireland. This was followed by reactions from stakeholders and selection of the ARG from the
46 stakeholders' present. The discussions with the ARG, informed the proposed research phases
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54 (Table 1):

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6 *Phase 1- Preparatory Work*. This stage starts with the project launch and formation of the Action
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8 Research Group (ARG). Members of the ARG have been purposively selected to work on the
9
10 policy development and implementation. The nature of action research is that the methodology of
11
12 the group is decided upon by the group and is likely to change and evolve as they address different
13
14 issues.²⁵ Following an action research approach, the group will thus **plan** what to do – take clear
15
16 and specific **action – observe** and collect data on the consequences of this action – and as a group
17
18 **reflect** on the implications for designing policy to and systems to promote access to AT. In order
19
20 to conduct preparatory work, we will conduct a literature review of academic and grey literature in
21
22 assistive technology in Malawi and review data available from existing datasets. The research
23
24 team will also assess inclusivity of the process of policy development and implementation in
25
26 existing policies using the EquIPP(Equity and Inclusion in Policy Processes) tool.³⁰ We will also
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28 support a country capacity assessment being completed in collaboration with other ongoing
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30 projects in Malawi.
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39 Phase 2 – Policy Development: Phase 2 will focus on the development of a draft policy, guided by
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41 the EquIPP framework for inclusive policy development. A theory of change³¹ will be undertaken
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43 to guide the APL development while Force Field Analysis³² to explore the political economy and
44
45 power relationships on AT in Malawi would be conducted.
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51 The ARG will design a Draft AT Policy, supported by the research team; drawing on the literature
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53 reviewed above and taking into account the Malawian context. It is anticipated that the resultant
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3 draft may also be assessed for the degree to which it promotes inclusivity (e.g. service users,
4 gender, rurality, poverty, etc.) using the EquiFrame tool.³³
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10 *Phase 3-System Development:* This phase involves the development of system strengthening
11 recommendations based on knowledge and information generated from the policy development
12 process. The ARG will also address what implications there are at the systems level for delivering
13 on the Draft AT Policy; and to recommend how these can be addressed in the Malawian context.
14 Data would be used to demonstrate the link between the different government ministries and
15 stakeholders to the SDG matrix; and thus highlight the relevance of AT to achievement of the
16 SDGs.⁴ A network analysis^{34, 35} would be undertaken to explore the strength and nature of
17 relationship between stakeholders on AT in Malawi. The collective leadership approach will be
18 very useful in this phase to ensure collective impact and system development.³⁶
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34 *Phase 4- Implementation and Evaluation:* This phase marks the beginning of the implementation
35 and evaluation of the AT policy developed. Over an agreed period, the participating government
36 ministries and stakeholders will identify a suitable service provider to trial the implementation of
37 the Draft AT Policy, with the support of the identified ministry and the research team. While the
38 ARG will be in a continuing process of evaluation and feedback themselves, stakeholders who
39 attended the project launch will be asked to attend a project review meeting where the ARG and
40 research team will present findings. The ARG will also identify AT service users to present their
41 experiences during this workshop. The SMART (Systems-Market for Assistive and Related
42 Technologies) Thinking Matrix framework will be used during the implementation and evaluation.³⁷
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6 *Phase 5-Knowledge Exchange:* This phase entails ensuring knowledge exchange impact of the
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8 research process. The ARG and the Research Team will use results from previous phases to
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10 identify key features that might be relevant for a generic National Framework for AT, that will be
11
12 generalised to other countries and contexts. In keeping with Action Research methodology, expert
13
14 advisers (all of whom we have worked with before) who will be available to provide support to the
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16 ARG shall provide feedback on the research process. This support could be provided either
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18 virtually or through attendance at project meeting in Malawi; as determined by the needs of the
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20 ARG and the available budget of the project.
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27 Action Research Methodology

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29 Throughout the five phases described above, we will use an Action Research Methodology²⁵
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31 informed by the needs of the ARG. This will take the form of Action Research Cycles each
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33 consisting of four components: plan, act, observe, and reflect (Figure 3), to answer the research
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35 questions which are posed by the ARG, and contribute to the development of each phase.
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47 **Figure 3. Action Research Process**

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51 Throughout these cycles, we will use multiple study methods to address the questions posed by
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53 the ARG (Table 1). For each research methodology, specific study procedures (Table 1) to
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produce requested content for use in the action research cycle will be decided in consultation with the ARG.

Table 1: Planned and anticipated research methodology

Research Phase	Methodology
Phase 1 - Preparatory Work: Understanding the Assistive technology context in Malawi	<ol style="list-style-type: none"> 1. Literature Review: Assistive technology service delivery and policy review using academic and grey literature 2. Data Review: Secondary data analysis of existing datasets (i.e. Census, SINTEF dataset) 3. Country Capacity Assessment: In collaboration with AT2030 and the Clinton Health Access Initiative 4. EquiPP: Review of existing policies for inclusive policy development processes
Phase 2 – Policy Development: Identifying Key Change Agents and Contexts	<ol style="list-style-type: none"> 5. EquiPP: Inclusive policy development process 6. Theory of Change: Development of theory of change for APL development 7. Field Analysis: Force Field Analysis and Bourdesian Analysis to understand political economy and power relationships
Phase 3 - Systems Development: Engagement in Collective Leadership to Achieve the SDGs	<ol style="list-style-type: none"> 8. SDG Matrix: Linking ministries to SDG achievement and role of AT 9. Network Analysis: Strength and nature of existing networks between key stakeholders in AT in Malawi
Phase 4 – Implementation and Evaluation: Delivering a Policy	<ol style="list-style-type: none"> 10. Systems Coherence Development: Addressing gaps in existing network to strengthen coherence for GATE 10Ps 11. Market Shaping Analysis: Smart Thinking Matrix

<p>or Strategy in Context</p>	<p>12. Piloting: Implementation of strategy in key areas with review of process and outcomes</p>
<p>Phase 5 – Knowledge Exchange: Applying Knowledge to the Global Context</p>	<p>13. Policy Framework: Identification of key concepts for broader applicability to other contexts</p> <p>14. Systems Implementation Framework: Specification of implementation system to be applied to other contexts</p>

Data collection and Management

All data including the transcripts will be stored according to the provisions of the Centre for Social Research, University of Malawi Research Practice and Procedures. Hence, all primary data will be held permanently following its acquisition and used in publication for the purpose of this study and recommendations of the ARG. All data will be anonymized and informed consent will be obtained from all study participants. A data dictionary will be kept and maintained for both quantitative and qualitative data to ensure that all authorized individuals are able to reuse the data. Secondary data would be obtained from National the Statistics Office and National Survey on living conditions of persons with disabilities (SINTEF).

Data Analysis

Quantitative data will be analysed using the Statistical Package for the Social Sciences (SPSS) version 23 while qualitative data will be analysed via *Atlas. ti version 7.5.18*. All data will be anonymized and not contain any personal identifiers. For qualitative data, content and framework analysis will be used while for quantitative data, descriptive statistics and regression analysis will

1
2
3 be undertaken to understand factors relevant for improved access to AT and creation of a nation
4
5
6 AT policy in Malawi.

7
8 The following tools would also be used to analyze the policy developed:
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- 10 • EquiPP³⁰ developed with the United Nations Partnership on the Rights of Persons with
11
12 Disabilities (UNPRPD) and which measures, evaluates and makes recommendations for
13
14 improvement in regard to inclusive policy development and evaluation
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16
- 17 • EquiFrame³³ which is a tool for Evaluating and Promoting the Inclusion of Vulnerable
18
19 Groups and Core Concepts of Human Rights in Health Policy Documents
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27 Ethics and Dissemination

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29 Ethical approval (SRESC-2019- 2378566) was obtained from the Maynooth University Social
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31 Research Ethics Committee while the research protocol has been submitted for approval to the
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33 University of Malawi Research Ethics Committee (UNIMAREC) for local ethical approval.
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36 The results from the study will be disseminated through presentations at conferences both
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38 within Malawi and abroad with stakeholders in and at international conferences; and publishing
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40 in peer-reviewed journals and on the websites of Maynooth and University of Malawi
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Discussion

The aim of APPLICABLE is to develop a national AT policy for Malawi and to contribute to the development of a framework in the process that may be relevant in other countries. Also, it is anticipated that the process will evolve a framework that will lead to strengthening of the AT ecosystem through collaborative action and partnership with all stakeholders.

These objectives informed the adoption of the Action Research approach that sets out on a research path without specific research agenda but entrusts the direction of the research to local and informed actors on AT in Malawi, to ensure a shared research agenda and development of context useful knowledge. This approach is in line with the ethos of the Mission Oriented Approach for AT proposed by Albala and colleagues.²⁷ It also avoids the common pitfall of most implementation research, where research is done for rather than with local stakeholders. Also, the action research approach ensures the development of context specific approaches for the development of APL for Malawi. Low income settings like Malawi have particular AT challenges that must take into consideration the local realities rather than adopting recommendations from high income settings with different socio-economic milieu. According to Gélinas-Bronsard and colleagues, accessing AT is a matter of resources.³⁸ While it is obvious that factors outside finance play a role in the access and utilization of AT, its pivotal role in LMICS, where health care insurance and social welfare packages are absent, is a key issue that the action research approach must explicitly address.

The Collective Leadership approach will help to ensure all stakeholders engaged in the action research approach feel a sense of ownership and promote buy-in at all levels in the

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2
3 implementation phase. Historically, in Malawi and in other countries, a single ministry
4 maintains responsibility for the development and implementation of policy – considered the
5 policy holder. In this case, either the ministry of Health or Gender and disability or Education
6 may desire to claim ownership on account of perceived ‘proximity’ of AT to their ministry.
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8 However, AT is more than just a health issue, or disability problem as shown by data from our
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implementation phase. Historically, in Malawi and in other countries, a single ministry maintains responsibility for the development and implementation of policy – considered the policy holder. In this case, either the ministry of Health or Gender and disability or Education may desire to claim ownership on account of perceived ‘proximity’ of AT to their ministry. However, AT is more than just a health issue, or disability problem as shown by data from our SDG matrix. It cuts across various sectors such as education, sports and therefore require collaborative approach. As shown by Tebbut and colleagues, AT is relevant for the achievement of each of the 17 SDGs;⁵ hence requires cross cutting collaboration between all players in Malawi. Interestingly, the collective leadership approach is noted to be useful for changing policy where many stakeholders exist and led to relevant policy changes in infant and young child feeding policies in seven countries in Southeast Asia.²⁹ Similarly, a systematic review by De Brun and colleagues showed that collectivistic leadership was associated positive outcomes in health care settings in Europe and North America.²⁸ It is pertinent to note that in order to solve social problems and achieve collective impact, commitment of all relevant actors is crucial³⁶. This integration between systems thinking and market shaping approach presents as practical and viable option to increase access to AT.³⁷

The strength of this study lies in its reliance on the Action Research method which ensures active participation of all stakeholders. Yet, the task of managing the interest of the ‘many’ and ensuring that every opinion counts will be a big challenge of the research process.

Conclusion

Gaps between research and practice or policy and practice gaps are some of the persistent problems in disability studies. In adopting an action research process, we intend to avoid these gaps to evolve a participatory and innovative process leading to development of an implementable AT policy in Malawi. The benefit of an AT policy in Malawi are numerous. However, a realistic and implementable policy would overcome the limitations of past policies on disability in Malawi that failed to address the health and social challenges of PWD. APPLICABLE present as an opportunity to demonstrative an innovative and participatory way of policy development that may be adapted for use in other settings.

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Author Contributions

IDE and MM conceptualized the protocol with significant contributions from EMS and AM. IDE wrote the initial draft which was reviewed by EMS, JF, MZJ, AM and MM. All authors read and approved the final version of the manuscript.

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Competing interests

None declared.

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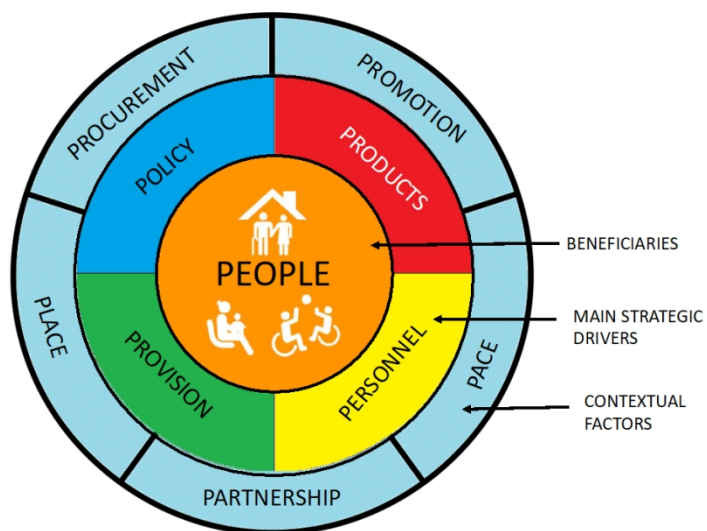
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The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan & Scherer, 2018, with permission)

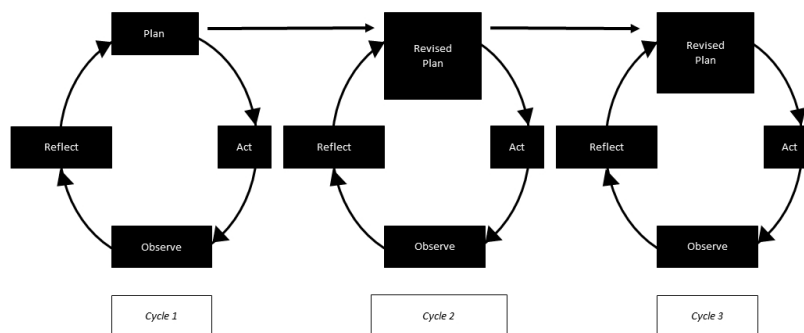
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Action Research Process

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BMJ Open

Implementation of the Assistive Product List (APL) in Malawi through development of appropriate policy and systems: An Action Research Protocol

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Primary Subject Heading:	Public health
Secondary Subject Heading:	Global health, Health policy, Health services research, Rehabilitation medicine
Keywords:	REHABILITATION MEDICINE, PUBLIC HEALTH, SOCIAL MEDICINE, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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3 1 Implementation of the Assistive Product List (APL) in Malawi through development of
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6 2 appropriate policy and systems: An Action Research Protocol
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Abstract

Introduction

Assistive Technology (AT) is important for the achievement of the Sustainable Development Goals (SDGs) for persons with disabilities (PWD). Increasingly, studies suggest a significant gap between the need for and demand for and provisions of AT for PWD in low- and middle-income settings. Evidence from high income countries highlights the importance of robust AT policies to the achievement of the recommendations of the World Health Assembly on AT. In Malawi, there

1 is no standalone AT policy. The objectives of the priority Assistive Product list Implementation
2 Creating Enablement of inclusive SDGs (APPLICABLE) project, are to propose and facilitate the
3 development of a framework for creating effective national Assistive Technology (AT) policy and
4 specify a system capable of implementing such policies in low-income countries such as Malawi.

5 **Method and analysis**

6 We propose an action research process with stakeholders in AT in Malawi. APPLICABLE will
7 adopt an action research paradigm, through developing a shared research agenda with
8 stakeholders and including users of AT. This involves the formation of an Action Research Group
9 (ARG) that will specify the priorities for practice - and policy-based evidence, in order to facilitate
10 the development of contextually realistic and achievable policy aspirations on AT in Malawi and
11 provide system strengthening recommendations that will ensure that the policy is implementable
12 for their realization. We will undertake an evaluation of this policy by measuring supply and support
13 for specific AT prior to, and following the implementation of the policy recommendations.

14 **Ethics and Dissemination**

15 The Maynooth University Research Ethics Committee approved the study protocol (SRESC-2019-
16 2378566) while ethical approval is being awaited from the University of Malawi Research Ethics
17 Committee. Findings from the study will be disseminated by publication in peer-reviewed journals,
18 presentations to stakeholders in Malawi, Ireland, and international audiences at international
19 conferences.

20
21 **Keywords:** Action Research, Assistive Technology Policy, Assistive Product List, Collective
22 Leadership, Malawi

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56 2 **Strength and Limitations of this Study**

8 3 ➤ This study will be the first in Africa to explore the development of a national Assistive
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10 4 Technology policy and Assistive Product list in response to the recommendations of the
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12 5 WHO.

15 6 ➤ The framework developed from this study, will lead to strengthening of the Assistive
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17 7 Technology ecosystem in Malawi and may be relevant in other countries with similar
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19 8 interest.

22 9 ➤ Using an emergent and action learning approach strengthens both the methods and
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24 10 reflexivity of the research process and ensures active participation of all stakeholders.

27 11 ➤ The use of a flexible research methodology may lead to researcher bias and deviation from
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29 12 the initial objectives may occur on account of the reliance on the contribution from multiple
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31 13 stakeholders.

34 14 ➤ The proposed principle of collective leadership may be a hard sell to the stakeholders in
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36 15 government who are used to the traditional single ministry lead in policy development.
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1 Introduction

2 Persons with disabilities (PWD) often experience overt and covert barriers to participation in
3 society and exercise of their rights.¹ These experiences of deprivation have dire implications
4 for PWD, depending on their location and type of impairment. This realization has led to
5 various efforts at both national and international level to ensure the reduction and elimination
6 of the deprivation experience by PWD.^{1, 2} The United Nations Convention on the Rights of
7 Persons with Disabilities (UN CRPD) and the Sustainable Development Goals (SDGs)
8 emphasize the importance of inclusion for PWD.^{3, 4} The SDGs highlight the importance of
9 social inclusion through the slogan- 'leave no one behind'.

10
11 Assistive Technology (AT) is pivotal to achieving this mandate of inclusion of PWD.^{4, 5} AT is a
12 'subset of health technology systems and refers to "the development and application of
13 organised knowledge, skills, procedures, and policies relevant to the provision, use, and
14 assessment of assistive products".⁶ while an assistive product is "any product (including
15 devices, equipment, instruments, and software), either specially designed and produced or
16 generally available, whose primary purpose is to maintain or improve an individual's
17 functioning and independence and thereby promote their wellbeing".⁶ Common examples of
18 assistive products in different impairment domains include wheelchairs, white canes, hearing
19 aids, communication boards and calendar pill boxes. In 2014, the WHO established the Global
20 Cooperation on Assistive Technology (GATE) in order to address the global need for AT.⁷
21 One of the first tasks for GATE was to establish a Priority Assistive Product List (APL)⁸ which
22 called for countries to develop their own context specific national APL, similar to the WHO

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3 1 Essential medicines list.⁹ The APL is not restrictive but a guide provided by GATE for countries
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6 2 to use in identifying national AT needs and priorities.⁸
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10 4 In a bid to improve access to AT , GATE recommended five priority (5Ps) themes, namely
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13 5 people, policy, products, provision and personnel.⁸ That schema put *people*, or users of AT,
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15 6 at the centre and policy, products, provision and personnel, as strategic points of action to
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17 7 improve access to AT around the world. In a series of position papers from the Global
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19 8 Research, Innovation and Education on Assistive Technology (GREAT) summit organized by
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21 9 GATE, people were identified as important drivers in AT access;¹⁰ context sensitive products
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23 10 were considered relevant for AT accessibility;¹¹ the development of an international standard
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25 11 for provision of AT was seen as important for service user safety,¹² and the certification of
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27 12 competency for AT personnel as important for staff training,¹³ along with an inclusive
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29 13 development of national AT policies, all to improve access to AT.¹⁴ Along with these papers,
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31 14 an additional 5 Ps – specifically referring to the context of AT services were also identified as
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33 15 emergent from the discussions at the Summit (see Figure 1) The additional 5Ps include
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35 16 Procurement, Place, Pace, Promotion and Partnership; and are key situational factors for
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37 17 systems in diverse context. These situate the previous 5 Ps in national and local contexts that
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39 18 determine access to AT. For instance, to ensure that *Procurement* or purchasing AT products
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41 19 occur at national level in line with national and contextual factors that take into account *Place*
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43 20 or differences in local settings; at a *Pace* that is feasible and can be absorbed within the
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45 21 systems' capacity, using context sensitive methods to *promote* positive images of AT users
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47 22 and with cross cutting *partnerships*.¹⁵
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6 2 **Figure 1: The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan**
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8 3 **& Scherer, 2018, with permission)**
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13 5 Sterman suggests that it is not a lack of resources, technical knowledge or commitment that
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15 6 prevents us from making improvements in public health services but rather, “What thwarts us
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17 7 is our lack of meaningful systems thinking capability”.¹⁶ Specifically in relation to AT,
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19 8 MacLachlan and Scherer argue that “a systems thinking approach allows for a meaningful
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21 9 linking of components and processes, a more realistic understanding of why and where
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23 10 initiatives might fail or succeed, and a more satisfying way of placing the user of assistive
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25 11 technology at the centre of ideas, activities and outcomes.”¹⁵
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32 13 **The Malawi Context**
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34 14 Increasingly, studies suggest low demand and provision of Assistive Technology (AT) for
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36 15 PWD in low- and middle-income settings.¹⁷ Malawi is a Southern African country with a
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38 16 population of about 18 million. The economy is largely agrarian, and the government depends
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40 17 on foreign aid. Malawi ranks 172 out 189 countries based on the United Nations Human
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42 18 Development Index.¹⁸ In Malawi, there are several policies and strategies at the national level
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44 19 which are relevant to the experiences of PWD, each which should have relevance to AT.
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46 20 Notably, the National Policy on the Equalization of Opportunities for PWD ¹⁹ and National
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48 21 Disability Mainstreaming Strategy and Implementation Plan;²⁰ yet there are no clear direction
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50 22 guidelines on how AT should be provided in the country ²⁰. It is pertinent to state that the
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3 1 National Policy on the Equalization of Opportunities for Persons with Disabilities was adopted
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6 2 in 2006; and processes are under way to develop a successor plan on account of its expiration.
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8 3 In Malawi, there is a huge gap between the need and access to services PWD.²¹ Although
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10 4 about 69% of PWD need assistive devices in Malawi, only 5% have access to them.²²
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13 5 Evidence from high income countries highlights the importance of robust AT policies for the
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15 6 achievement of the recommendations of the WHA on AT.²³ In Malawi, there is no standalone
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17 7 AT policy.²⁴
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23 9 The objectives of the Assistive Product List Implementation Creating Enablement of inclusive
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25 10 SDGs (APPLICABLE) project are (i) to propose and facilitate the development of *a framework*
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27 11 for creating effective national Assistive Technology (AT) policy and (ii) *specify a system*
28
29 12 capable of implementing that policy in Malawi.
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33 13 [Methods and Analysis](#)

34 14 [Approach](#)

35
36 15 The study will adopt an action research approach²⁵ and shared research agenda in
37
38 16 collaboration with AT stakeholders in Malawi to achieve the study objectives. Hence, this
39
40 17 research protocol is based on a proposed research plan by the research teams at Maynooth
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42 18 University and the University of Malawi and the discussions held during the project launch and
43
44 19 formation of an Action Research Group (ARG) in Malawi.
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47 20 The relevance of action research for solving persistent problems has been extensively reported.²⁵
48
49 21 Boger et al recommend collaborative transdisciplinary approach for solving persistent problems
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51 22 in AT.²⁶ In adopting this method, we aim to ensure that the process of AT policy development is
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53 23 participatory, collaborative and undertaken through a transparent and reflexive process with
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1 relevant stakeholders in Malawi. Equally essential is the relevance of the action research paradigm
2 to the systems-thinking and mission-oriented approach which are central to the objectives of
3 APPLICABLE. A systems thinking approach will ensure APPLICABLE focuses on the range of
4 Ps (described above) to bridge the AT systems Gap in Malawi.^{15, 27} 'Collective leadership'^{28, 29} will
5 be a guiding principle for the research, whereby all the participating ministries and other major
6 stakeholders, take active leadership in the project in order to engender collective impact which is
7 supported by research. Collective leadership refers to a group of people working together to
8 achieve a set goal.^{28, 29} In this case, we envision co-construction of leadership and shared
9 responsibility by different stakeholders involved in AT in Malawi.³⁰ According to De Bruin et al.,
10 collective leadership was associated with improved communication and role clarity, greater
11 willingness to adopt leadership roles and 'give and take' by leaders, who became more willing to
12 share leadership responsibilities.²⁸ Also, Michaud-Létourneau suggest that the approach is useful
13 for changing policy where many stakeholders exist.²⁹ We would strive to minimize power
14 imbalances and the pitfalls of collective leadership by continuous learning and knowledge sharing
15 to co-construct what works for everyone through reflective dialogues.³¹

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17
18 The specific research methods described below are tactical and will be decided with the ARG in
19 an iterative process through a series of five phases, each comprised of Action Research Cycles.
20 The content for each of those action research cycles will be decided with key stakeholders in AT
21 in Malawi through the formation of an Action Research Group (ARG).

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5 2 **Formative Research**
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7 3 Prior to the project launch, a series of steps were undertaken as part of the formative research
8
9 4 process. Initial meetings were held with the Ministries of Gender, Children, Disability and Social
10
11 5 Welfare (MoGCD&SW), Health, Education, and Labour, Disabled People's Organisations, other
12
13 6 civil society, service providers, donors, industry and UN agencies. Presentation and discussions
14
15 7 on establishing a AT policy and implementation systems in Malawi were discussed and the
16
17 8 stakeholders expressed interest in the 36 months (January 2019-December 2021) project.

19 9 The project launch was held on the 6th of December 2019 with over 40 stakeholders drawn from
20
21 10 five broad stakeholder groups namely:

- 26 11 1. Government Stakeholders (e.g. Ministries of Health, Education, Gender and Persons with
27
28 12 Disabilities and the Elderly)
- 31 13 2. Non-governmental non-profit stakeholders (e.g. Federation of Disability Organization in
32
33 14 Malawi (FEDOMA), and Beit Cure International Hospital (BT) Malawi Council for the
34
35 15 handicapped (MACOHA))
- 38 16 3. Non-governmental for-profit stakeholders (Pharmacist, Physiotherapist)
- 40
41 17 4. Academic Institutions
- 43 18 5. United Nation agencies (e.g. UNICEF, WHO, UNDP)

45 19 It is pertinent to state that persons with disabilities and users AT products are not restricted to only
46
47 20 group four but are also in the other groups. They are involved in all the research processes and
48
49 21 as part of the ARG.

52 22 The formative research stage describes activities undertaken prior to the project launch. We would
53
54 23 now describe the proposed research phases developed following the project launch.

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5 2 **Research Phases**
6
7 3 The study will be conducted in five phases. The details of each phase will be collaboratively
8
9 4 decided during the action research project, but these phases will guide the work throughout the
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11 5 project.

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14 6 The five phases of the research are Preparatory Work, Policy Development, Systems
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16 7 Development, Implementation and Evaluation, and Knowledge Exchange (Figure 2).
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24 10 **Figure 2: APPLICABLE research phases**
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29 12 *Phase 1- Preparatory Work.* This stage starts with the project launch and formation of the Action
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31 13 Research Group (ARG). Following the project launch, 15 persons were invited from the
32
33 14 stakeholders present to join the ARG. Members of the ARG have been purposively selected to
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35 15 work on the policy development and implementation.

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38 16 The ARG adopted the proposed process and agreed that:

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41 17
 - A realistic AT policy and delivery system is needed in Malawi.
- 42
43 18
 - That ownership of the policy will be further discussed and that initially it will be co-led by
- 44
45 19 members of the Action Research Group.
- 46
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48 20
 - Data will be stored at the Centre for Social Research, Malawi.

49
50 21 The launch was organized in collaboration with Clinton Health access Initiative (CHAI) who
51
52 22 previously conducted a baseline survey on AT in Malawi. They presented the results on their
53
54 23 survey after which APPLICABLE was introduced by the Principal investigators from Malawi and

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3 1 Ireland. This was followed by reactions from stakeholders and selection of the ARG from the
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5
6 2 stakeholders' present. The discussions with the ARG, informed the proposed research phases
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8 3 (Table 1):
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12
13 5 The nature of action research is that the methodology of the group is decided upon by the group
14
15 6 and is likely to change and evolve as they address different issues.²⁵ Following an action research
16
17 7 approach, the group will thus **plan** what to do – take clear and specific **action** – **observe** and collect
18
19 8 data on the consequences of this action – and as a group **reflect** on the implications for designing
20
21 9 policy to and systems to promote access to AT. In order to conduct preparatory work, we will
22
23 10 conduct a literature review of academic and grey literature in assistive technology in Malawi and
24
25 11 review data available from existing datasets. In addition, we would conduct interviews with users
26
27 12 and providers of AT guided by the data from a Country Capacity assessment by the Clinton Health
28
29 13 Access Initiative (CHAI) in partnership with the Assistive Technology 2030 project. The research
30
31 14 team will also assess inclusivity of the process of policy development and implementation in
32
33 15 existing policies using the EquIPP (Equity and Inclusion in Policy Processes) tool.³² The EquIPP
34
35 16 ³² tool was developed with the United Nations Partnership on the Rights of Persons with
36
37 17 Disabilities (UNPRPD) and measures, evaluates and makes recommendations for improvement
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39 18 in regard to inclusive policy development and evaluation. It consists of 17 Key Actions that provide
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41 19 guidance on how to ensure an equitable and inclusive policy development process.
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51 21 Phase 2 – Policy Development: Phase 2 will focus on the development of a draft policy, guided by
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53 22 the EquIPP framework for inclusive policy development. A theory of change³³ will be undertaken
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3 1 to guide the APL development while Force Field Analysis³⁴ to explore the political economy and
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6 2 power relationships on AT in Malawi would be conducted. Force Field Analysis³⁴ is a qualitative
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8 3 research method that conceptualises how forces for and against change are poised and thus
9
10 4 helps in the systematic analysis of possible change processes. Bourdesian Analysis³⁵ applies
11
12 5 the idea of the social space being composed of fields of identify and power relations which are
13
14
15 6 likely to influence change process.
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20 8 The ARG will design a Draft AT Policy, supported by the research team; drawing on the literature
21
22 9 reviewed above and taking into account the Malawian context. It is anticipated that the resultant
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24
25 10 draft may also be assessed for the degree to which it promotes inclusivity (e.g. service users,
26
27 11 gender, rurality, poverty, etc.) using the EquiFrame tool.³⁶ EquiFrame³⁶ which is a tool for
28
29
30 12 Evaluating and Promoting the Inclusion of Vulnerable Groups and Core Concepts of Human
31
32 13 Rights in Health Policy Documents. It consists of 21 Core Concepts that covers issues relating to
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35 14 universal, equitable and accessible healthcare.
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44 17 *Phase 3-System Development:* This phase involves the development of system strengthening
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46 18 recommendations based on knowledge and information generated from the policy development
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48 19 process. The ARG will also address what implications there are at the systems level for delivering
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50 20 on the Draft AT Policy; and to recommend how these can be addressed in the Malawian context.
51
52 21 Data would be used to demonstrate the link between the different government ministries and
53
54 22 stakeholders to the SDG matrix; and thus highlight the relevance of AT to achievement of the
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3 1 SDGs.⁴ The SDG Matrix will be used to demonstrate the concept that that assistive products have
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6 2 a direct impact on the achievement of the SGDs. Tebbutt and colleagues suggest that assistive
7
8 3 products can be both mediators and a moderators of SDG achievement ⁵ A network analysis^{37, 38}
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10 4 would be undertaken to explore the strength and nature of relationship between stakeholders on
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12
13 5 AT in Malawi. The collective leadership approach will be very useful in this phase to ensure
14
15 6 collective impact and system development.³⁹
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20 8 *Phase 4- Implementation and Evaluation.* This phase marks the beginning of the implementation
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22 9 and evaluation of the AT policy developed. Over an agreed period, the participating government
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24
25 10 ministries and stakeholders will identify a suitable service provider to trial the implementation of
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27
28 11 the Draft AT Policy, with the support of the identified ministry and the research team. While the
29
30 12 ARG will be in a continuing process of evaluation and feedback themselves, stakeholders who
31
32 13 attended the project launch will be asked to attend a project review meeting where the ARG and
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35 14 research team will present findings. The ARG will also identify AT service users to present their
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37 15 experiences during this workshop. The SMART (Systems-Market for Assistive and Related
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39 16 Technologies) Thinking Matrix framework will be used during the implementation and
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41
42 17 evaluation.⁴⁰ The SMART Thinking Matrix is a framework for conceptualizing intersections
43
44 18 between systems levels and market shaping for assistive technology and was derived form a
45
46 19 systematic review of the interface between these two literatures.⁴⁰
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51 21 *Phase 5-Knowledge Exchange.* This phase entails ensuring knowledge exchange impact of the
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54 22 research process. The ARG and the Research Team will use results from previous phases to
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3 1 identify key features that might be relevant for a generic National Framework for AT, that will be
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5
6 2 generalised to other countries and contexts. In keeping with Action Research methodology, expert
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8 3 advisers (all of whom we have worked with before) who will be available to provide support to the
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10 4 ARG shall provide feedback on the research process. This support could be provided either
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13 5 virtually or through attendance at project meeting in Malawi; as determined by the needs of the
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15 6 ARG and the available budget of the project.
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20 8 Action Research Methodology

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22 9 Throughout the five phases described above, we will use an Action Research Methodology²⁵
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24
25 10 informed by the needs of the ARG. This will take the form of Action Research Cycles each
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27 11 consisting of four components: plan, act, observe, and reflect (Figure 3), to answer the research
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29 12 questions which are posed by the ARG, and contribute to the development of each phase.
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39 16 **Figure 3. Action Research Process**

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44 18 Throughout these cycles, we will use multiple study methods to address the questions posed by
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46 19 the ARG (Table 1). For each research methodology, specific study procedures (Table 1) to
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48 20 produce requested content for use in the action research cycle will be decided with the ARG.
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2 **Table 1: Planned and anticipated research methodology**

Research Phase	Methodology
Phase 1 - Preparatory Work: Understanding the Assistive technology context in Malawi	<ol style="list-style-type: none"> 1. Literature Review: Assistive technology service delivery and policy review using academic and grey literature 2. Data Review: Secondary data analysis of existing datasets (i.e. Census, SINTEF dataset) and interviews 3. Country Capacity Assessment: In collaboration with AT2030 and the Clinton Health Access Initiative 4. EquiPP: Review of existing policies for inclusive policy development processes
Phase 2 – Policy Development: Identifying Key Change Agents and Contexts	<ol style="list-style-type: none"> 5. EquiPP: Inclusive policy development process 6. Theory of Change: Development of theory of change for APL development 7. Field Analysis: Force Field Analysis and Bourdesian Analysis to understand political economy and power relationships
Phase 3 - Systems Development: Engagement in Collective Leadership to Achieve the SDGs	<ol style="list-style-type: none"> 8. SDG Matrix: Linking ministries to SDG achievement and role of AT 9. Network Analysis: Strength and nature of existing networks between key stakeholders in AT in Malawi
Phase 4 – Implementation and Evaluation: Delivering a Policy	<ol style="list-style-type: none"> 10. Systems Coherence Development: Addressing gaps in existing network to strengthen coherence for GATE 10Ps 11. Market Shaping Analysis: Smart Thinking Matrix

<p>or Strategy in Context</p>	<p>12. Piloting: Implementation of strategy in key areas with review of process and outcomes</p>
<p>Phase 5 – Knowledge Exchange: Applying Knowledge to the Global Context</p>	<p>13. Policy Framework: Identification of key concepts for broader applicability to other contexts</p> <p>14. Systems Implementation Framework: Specification of implementation system to be applied to other contexts</p>

Data collection and Management

All data including the transcripts will be stored according to the provisions of the Centre for Social Research, University of Malawi Research Practice and Procedures. Hence, all primary data will be held permanently following its acquisition and used in publication for the purpose of this study and recommendations of the ARG. All data will be anonymized, and informed consent will be obtained from all study participants and stakeholders at every stage of the research process. Study participants entail all who are recruited or invited to participate in the study and may include stakeholders who are users or providers of AT. A data dictionary will be kept and maintained for both quantitative and qualitative data to ensure that all authorized individuals are able to reuse the data. Secondary data would be obtained from National the Statistics Office and National Survey on living conditions of persons with disabilities (SINTEF).

Data Analysis

The data analysis method adopted will be dependent on the data type from the different phases of the study. For instance, analytic review methods would be used for literature and document review in phases 1 and 5.⁴¹ For qualitative data(From phases 1-5), content and framework analysis

1 will be used while for quantitative data (Phase 1, 2 and 3), descriptive statistics and regression
2 analysis will be undertaken to understand factors relevant for improved access to AT and creation
3 of a nation AT policy in Malawi.⁴¹

4 The EquIPP and EquiFrame tools^{32, 36} would also be used to analyze existing policy on disability
5 and the proposed AT policy. Quantitative data will be analysed using the Statistical Package for
6 the Social Sciences (SPSS) version 23 while qualitative data will be analysed via *Atlas. ti version*
7 *7.5.18*. All data will be anonymized and not contain any personal identifiers.

8

9 Patient and Public Involvement

10 No patient involved

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12 Ethics and Dissemination

13 Ethical approval (SRESC-2019- 2378566) was obtained from the Maynooth University Social
14 Research Ethics Committee while final ethical approval is being awaited from the University of
15 Malawi Research Ethics Committee (UNIMAREC).

16 The results from the study will be disseminated through presentations at conferences both
17 within Malawi and abroad with stakeholders in and at international conferences; and publishing
18 in peer-reviewed journals and on the websites of Maynooth and University of Malawi

19

20 Discussion

21 The aim of APPLICABLE is to develop a national AT policy for Malawi and to contribute to the
22 development of a framework in the process that may be relevant in other countries. Also, it is

1 anticipated that the process will evolve a framework that will lead to strengthening of the AT
2 ecosystem through collaborative action and partnership with all stakeholders.

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11 4 These objectives informed the adoption of the Action Research approach that sets out on a
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13 5 research path without specific research agenda but entrusts the direction of the research to
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15 6 local and informed actors on AT in Malawi, to ensure a shared research agenda and
16
17 7 development of context useful knowledge. This approach is in line with the ethos of the Mission
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19 8 Oriented Approach for AT proposed by Albala and colleagues.²⁷ It also avoids the common
20
21 9 pitfall of most implementation research, where research is done for rather than with local
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23 10 stakeholders. Also, the action research approach ensures the development of context specific
24
25 11 approaches for the development of APL for Malawi. Low income settings like Malawi have
26
27 12 particular AT challenges that must take into consideration the local realities rather than
28
29 13 adopting recommendations from high income settings with different socio-economic milieu.
30
31 14 According to Gélinas-Bronsard and colleagues, accessing AT is a matter of resources.³⁰ While
32
33 15 it is obvious that factors outside finance play a role in the access and utilization of AT, its
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35 16 pivotal role in LMICS, where health care insurance and social welfare packages are absent,
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37 17 is a key issue that the action research approach must explicitly address.

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46 19 The Collective Leadership approach will help to ensure all stakeholders engaged in the action
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48 20 research approach feel a sense of ownership and promote buy-in at all levels in the
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50 21 implementation phase. Historically, in Malawi and in other countries, a single ministry
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52 22 maintains responsibility for the development and implementation of policy – considered the
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3 1 policy holder. In this case, either the ministry of Health or Gender and disability or Education
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6 2 may desire to claim ownership on account of perceived 'proximity' of AT to their ministry.
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8 3 However, AT is more than just a health issue, or disability problem as shown by data from our
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10 4 SDG matrix. It cuts across various sectors such as education, sports and therefore require
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13 5 collaborative approach. As shown by Tebbut and colleagues, AT is relevant for the
14
15 6 achievement of each of the 17 SDGs;⁵ hence requires cross cutting collaboration between all
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18 7 players in Malawi. Interestingly, the collective leadership approach is noted to be useful for
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20 8 changing policy where many stakeholders exist and led to relevant policy changes in infant
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23 9 and young child feeding policies in seven countries in Southeast Asia.²⁹ Similarly, a systematic
24
25 10 review by De Brun and colleagues showed that collectivistic leadership was associated
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28 11 positive outcomes in health care settings in Europe and North America.²⁸ It is pertinent to note
29
30 12 that in order to solve social problems and achieve collective impact, commitment of all relevant
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33 13 actors is crucial³⁹. This integration between systems thinking and market shaping approach
34
35 14 presents as practical and viable option to increase access to AT.⁴⁰
36
37 15 The strength of this study lies in its reliance on the Action Research method which ensures active
38
39 16 participation of all stakeholders. Yet, the task of managing the interest of the 'many' and ensuring
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41
42 17 that every opinion '*counts*' may be the big challenge of the research process. We hope to address
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44 18 these through action learning and transdisciplinary approaches recommended for use in assistive
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46 19 technology projects.²⁶
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51
52 21 Gaps between research and practice or policy and practice gaps are some of the persistent
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54 22 problems in disability studies. In adopting an action research process, we intend to avoid these
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3 1 gaps to evolve a participatory and innovative process leading to development of an implementable
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6 2 AT policy in Malawi. The benefits of an AT policy in Malawi are numerous. However, a realistic
7
8 3 and implementable policy would overcome the limitations of past policies on disability in Malawi
9
10 4 that failed to address the health and social challenges of PWD. APPLICABLE presents as an
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13 5 opportunity to demonstrate an innovative and participatory way of policy development that may
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15 6 be adapted for use in other settings.
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3 involved in the formative research process.

4 Author Contributions

5 IDE and MM conceptualized the protocol with significant contributions from EMS and AM. IDE
6 wrote the initial draft which was reviewed by EMS, JF, MZJ, AM and MM. All authors read and
7 approved the final version of the manuscript.

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13 Competing interests

14 None declared.

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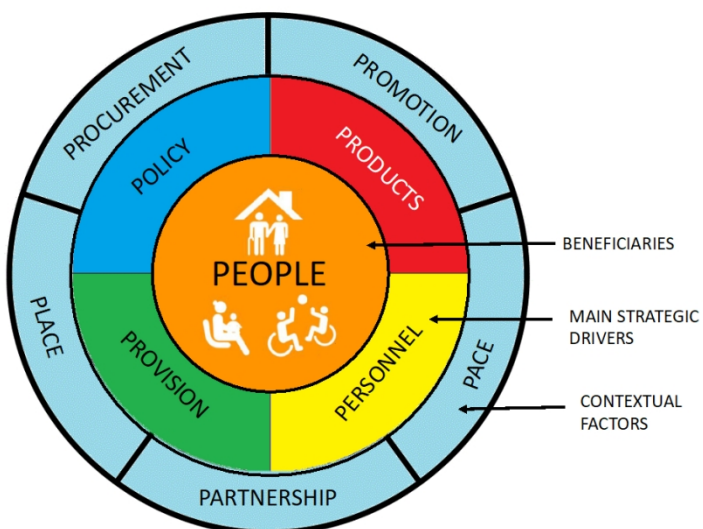
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The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan & Scherer, 2018, with permission)

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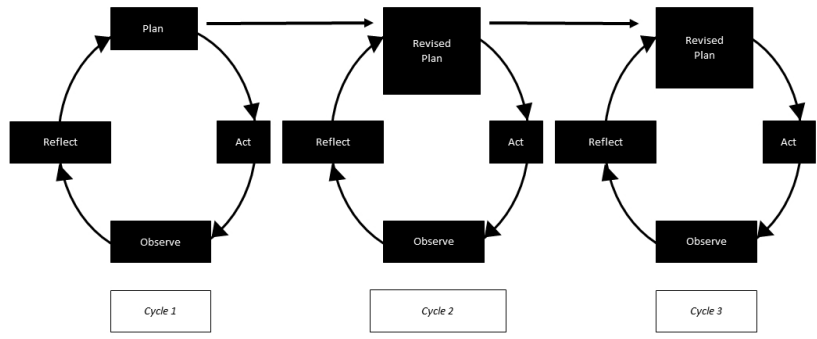
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Action Research Process

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BMJ Open

Implementation of the Assistive Product List (APL) in Malawi through development of appropriate policy and systems: An Action Research Protocol

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3 1 Implementation of the Assistive Product List (APL) in Malawi through development of
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6 2 appropriate policy and systems: An Action Research Protocol
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Abstract

Introduction

Assistive Technology (AT) is important for the achievement of the Sustainable Development Goals (SDGs) for persons with disabilities (PWD). Increasingly, studies suggest a significant gap between the need for and demand for and provisions of AT for PWD in low- and middle-income settings. Evidence from high income countries highlights the importance of robust AT policies to the achievement of the recommendations of the World Health Assembly on AT. In Malawi, there

1 is no standalone AT policy. The objectives of the priority Assistive Product list Implementation
2 Creating Enablement of inclusive SDGs (APPLICABLE) project, are to propose and facilitate the
3 development of a framework for creating effective national Assistive Technology (AT) policy and
4 specify a system capable of implementing such policies in low-income countries such as Malawi.

5 **Method and analysis**

6 We propose an action research process with stakeholders in AT in Malawi. APPLICABLE will
7 adopt an action research paradigm, through developing a shared research agenda with
8 stakeholders and including users of AT. This involves the formation of an Action Research Group
9 (ARG) that will specify the priorities for practice - and policy-based evidence, in order to facilitate
10 the development of contextually realistic and achievable policy aspirations on AT in Malawi and
11 provide system strengthening recommendations that will ensure that the policy is implementable
12 for their realization. We will undertake an evaluation of this policy by measuring supply and support
13 for specific AT prior to, and following the implementation of the policy recommendations.

14 **Ethics and Dissemination**

15 The study protocol was approved by Maynooth University Research Ethics Committee (SRESC-
16 2019- 2378566) and University of Malawi Research Ethics Committee (P.01/20/10). Findings from
17 the study will be disseminated by publication in peer-reviewed journals, presentations to
18 stakeholders in Malawi, Ireland, and international audiences at international conferences.

19
20 **Keywords:** Action Research, Assistive Technology Policy, Assistive Product List, Collective
21 Leadership, Malawi

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56 2 **Strength and Limitations of this Study**

8 3 ➤ This study will be the first in Africa to explore the development of a national Assistive
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10 4 Technology policy and Assistive Product list in response to the recommendations of the
11
12 5 WHO.

15 6 ➤ The framework developed from this study, will lead to strengthening of the Assistive
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17 7 Technology ecosystem in Malawi and may be relevant in other countries with similar
18
19 8 interest.

22 9 ➤ Using an emergent and action learning approach strengthens both the methods and
23
24 10 reflexivity of the research process and ensures active participation of all stakeholders.

27 11 ➤ The use of a flexible research methodology may lead to researcher bias and deviation from
28
29 12 the initial objectives may occur on account of the reliance on the contribution from multiple
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31 13 stakeholders.

34 14 ➤ The proposed principle of collective leadership may be a hard sell to the stakeholders in
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36 15 government who are used to the traditional single ministry lead in policy development.

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1 Introduction

2 Persons with disabilities (PWD) often experience overt and covert barriers to participation in
3 society and exercise of their rights.¹ These experiences of deprivation have dire implications
4 for PWD, depending on their location and type of impairment. This realization has led to
5 various efforts at both national and international level to ensure the reduction and elimination
6 of the deprivation experience by PWD.^{1, 2} The United Nations Convention on the Rights of
7 Persons with Disabilities (UN CRPD) and the Sustainable Development Goals (SDGs)
8 emphasize the importance of inclusion for PWD.^{3, 4} The SDGs highlight the importance of
9 social inclusion through the slogan- 'leave no one behind'.

10
11 Assistive Technology (AT) is pivotal to achieving this mandate of inclusion of PWD.^{4, 5} AT is a
12 'subset of health technology systems and refers to "the development and application of
13 organised knowledge, skills, procedures, and policies relevant to the provision, use, and
14 assessment of assistive products".⁶ while an assistive product is "any product (including
15 devices, equipment, instruments, and software), either specially designed and produced or
16 generally available, whose primary purpose is to maintain or improve an individual's
17 functioning and independence and thereby promote their wellbeing".⁶ Common examples of
18 assistive products in different impairment domains include wheelchairs, white canes, hearing
19 aids, communication boards and calendar pill boxes. In 2014, the WHO established the Global
20 Cooperation on Assistive Technology (GATE) in order to address the global need for AT.⁷
21 One of the first tasks for GATE was to establish a Priority Assistive Product List (APL)⁸ which
22 called for countries to develop their own context specific national APL, similar to the WHO

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3 1 Essential medicines list.⁹ The APL is not restrictive but a guide provided by GATE for countries
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6 2 to use in identifying national AT needs and priorities.⁸
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10 4 In a bid to improve access to AT , GATE recommended five priority (5Ps) themes, namely
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13 5 people, policy, products, provision and personnel.⁸ That schema put *people*, or users of AT,
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15 6 at the centre and policy, products, provision and personnel, as strategic points of action to
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17 7 improve access to AT around the world. In a series of position papers from the Global
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19 8 Research, Innovation and Education on Assistive Technology (GREAT) summit organized by
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21 9 GATE, people were identified as important drivers in AT access;¹⁰ context sensitive products
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23 10 were considered relevant for AT accessibility;¹¹ the development of an international standard
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25 11 for provision of AT was seen as important for service user safety,¹² and the certification of
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27 12 competency for AT personnel as important for staff training,¹³ along with an inclusive
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29 13 development of national AT policies, all to improve access to AT.¹⁴ Along with these papers,
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31 14 an additional 5 Ps – specifically referring to the context of AT services were also identified as
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33 15 emergent from the discussions at the Summit (see Figure 1) The additional 5Ps include
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35 16 Procurement, Place, Pace, Promotion and Partnership; and are key situational factors for
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37 17 systems in diverse context. These situate the previous 5 Ps in national and local contexts that
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39 18 determine access to AT. For instance, to ensure that *Procurement* or purchasing AT products
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41 19 occur at national level in line with national and contextual factors that take into account *Place*
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43 20 or differences in local settings; at a *Pace* that is feasible and can be absorbed within the
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45 21 systems' capacity, using context sensitive methods to *promote* positive images of AT users
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47 22 and with cross cutting *partnerships*.¹⁵
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6 2 **Figure 1: The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan**
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8 3 **& Scherer, 2018, with permission)**
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13 5 Sterman suggests that it is not a lack of resources, technical knowledge or commitment that
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15 6 prevents us from making improvements in public health services but rather, “What thwarts us
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17 7 is our lack of meaningful systems thinking capability”.¹⁶ Specifically in relation to AT,
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19 8 MacLachlan and Scherer argue that “a systems thinking approach allows for a meaningful
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21 9 linking of components and processes, a more realistic understanding of why and where
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23 10 initiatives might fail or succeed, and a more satisfying way of placing the user of assistive
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25 11 technology at the centre of ideas, activities and outcomes.”¹⁵
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32 13 **The Malawi Context**
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34 14 Increasingly, studies suggest low demand and provision of Assistive Technology (AT) for
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36 15 PWD in low- and middle-income settings.¹⁷ Malawi is a Southern African country with a
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38 16 population of about 18 million. The economy is largely agrarian, and the government depends
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40 17 on foreign aid. Malawi ranks 172 out 189 countries based on the United Nations Human
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42 18 Development Index.¹⁸ In Malawi, there are several policies and strategies at the national level
43
44 19 which are relevant to the experiences of PWD, each which should have relevance to AT.
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46 20 Notably, the National Policy on the Equalization of Opportunities for PWD ¹⁹ and National
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48 21 Disability Mainstreaming Strategy and Implementation Plan;²⁰ yet there are no clear direction
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50 22 guidelines on how AT should be provided in the country ²⁰. It is pertinent to state that the
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3 1 National Policy on the Equalization of Opportunities for Persons with Disabilities was adopted
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6 2 in 2006; and processes are underway to develop a successor plan on account of its expiration.
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8 3 In Malawi, there is a huge gap between the need and access to services PWD.²¹ Although
9
10 4 about 69% of PWD need assistive devices in Malawi, only 5% have access to them.²²
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13 5 Evidence from high income countries highlights the importance of robust AT policies for the
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15 6 achievement of the recommendations of the WHA on AT.²³ In Malawi, there is no standalone
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17 7 AT policy.²⁴
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23 9 The objectives of the Assistive Product List Implementation Creating Enablement of inclusive
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25 10 SDGs (APPLICABLE) project are (i) to propose and facilitate the development of *a framework*
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27 11 for creating effective national Assistive Technology (AT) policy and (ii) *specify a system*
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29 12 capable of implementing that policy in Malawi.
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33 13 [Methods and Analysis](#)

34 14 [Approach](#)

35
36 15 The study will adopt an action research approach²⁵ and shared research agenda in
37
38 16 collaboration with AT stakeholders in Malawi to achieve the study objectives. Hence, this
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40 17 research protocol is based on a proposed research plan by the research teams at Maynooth
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42 18 University and the University of Malawi and the discussions held during the project launch and
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44 19 formation of an Action Research Group (ARG) in Malawi.
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47 20 The relevance of action research for solving persistent problems has been extensively reported.²⁵
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49 21 Boger et al recommend collaborative transdisciplinary approach for solving persistent problems
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51 22 in AT.²⁶ In adopting this method, we aim to ensure that the process of AT policy development is
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53 23 participatory, collaborative and undertaken through a transparent and reflexive process with
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1 relevant stakeholders in Malawi. Equally essential is the relevance of the action research paradigm
2 to the systems-thinking and mission-oriented approach which are central to the objectives of
3 APPLICABLE. A systems thinking approach will ensure APPLICABLE focuses on the range of
4 Ps (described above) to bridge the AT systems Gap in Malawi.^{15, 27} 'Collective leadership'^{28, 29} will
5 be a guiding principle for the research, whereby all the participating ministries and other major
6 stakeholders, take active leadership in the project in order to engender collective impact which is
7 supported by research. Collective leadership refers to a group of people working together to
8 achieve a set goal.^{28, 29} In this case, we envision co-construction of leadership and shared
9 responsibility by different stakeholders involved in AT in Malawi.³⁰ According to De Bruin et al.,
10 collective leadership was associated with improved communication and role clarity, greater
11 willingness to adopt leadership roles and 'give and take' by leaders, who became more willing to
12 share leadership responsibilities.²⁸ Also, Michaud-Létourneau suggest that the approach is useful
13 for changing policy where many stakeholders exist.²⁹ We will strive to minimize power imbalances
14 and the pitfalls of collective leadership by continuous learning and knowledge sharing to co-
15 construct what works for everyone through reflective dialogues.³¹

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18 The specific research methods described below are tactical and will be decided with the ARG in
19 an iterative process through a series of five phases, each comprised of Action Research Cycles.
20 The content for each of those action research cycles will be decided with key stakeholders in AT
21 in Malawi through the formation of an ARG.

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5 2 **Formative Research**
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7 3 Prior to the project launch, a series of steps were undertaken as part of the formative research
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9 4 process. Initial meetings were held with the Ministries of Gender, Children, Disability and Social
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11 5 Welfare (MoGCD&SW), Health, Education, and Labour, Disabled People's Organisations, other
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13 6 civil society, service providers, donors, industry and UN agencies. Presentation and discussions
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15 7 on establishing a AT policy and implementation systems in Malawi were discussed and the
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17 8 stakeholders expressed interest in the 36 months (January 2019-December 2021) project.

19 9 The project launch was held on the 6th of December 2019 with over 40 stakeholders drawn from
20
21 10 five broad stakeholder groups namely:

- 26 11 1. Government Stakeholders (e.g. Ministries of Health, Education, Gender and Persons with
27
28 12 Disabilities and the Elderly)
- 31 13 2. Non-governmental non-profit stakeholders (e.g. Federation of Disability Organization in
32
33 14 Malawi (FEDOMA), Beit Cure International Hospital (BT), Malawi Council for the
34
35 15 Handicapped (MACOHA))
- 38 16 3. Non-governmental for-profit stakeholders (Pharmacist, Physiotherapist)
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41 17 4. Academic Institutions
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43 18 5. United Nation agencies (e.g. UNICEF, WHO, UNDP)

45 19 It is pertinent to state that persons with disabilities and users AT products are not restricted to only
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47 20 group two but are also in the other groups. They are involved in all the research processes and
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49 21 as part of the ARG.

52 22 The formative research stage describes activities undertaken prior to the project launch. The
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54 23 following sections describe the proposed research phases developed following the project launch.

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6 2 **Research Phases**
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8 3 The study will be conducted in five phases. The details of each phase will be collaboratively
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10 4 decided during the action research project, but these phases will guide the work throughout the
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12 5 project.

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14 6 The five phases of the research are Preparatory Work, Policy Development, Systems
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16 7 Development, Implementation and Evaluation, and Knowledge Exchange (Figure 2).
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24 10 **Figure 2: APPLICABLE research phases**
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29 12 *Phase 1- Preparatory Work.* This stage starts with the project launch and formation of the Action
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31 13 Research Group (ARG). Following the project launch, 15 persons were invited from the
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33 14 stakeholders present to join the ARG. Members of the ARG have been purposively selected to
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35 15 work on the policy development and implementation.

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38 16 The ARG adopted the proposed process and agreed that:

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 - A realistic AT policy and delivery system is needed in Malawi; and
 - That ownership of the policy will be further discussed and that initially it will be co-led by

42
43 18 members of the Action Research Group; and

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 - Data will be stored at the Centre for Social Research, Malawi.

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50 21 The launch was organized in collaboration with Clinton Health Access Initiative (CHAI) who
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52 22 previously conducted a baseline survey on AT in Malawi. They presented the results on their
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54 23 survey, after which APPLICABLE was introduced by the Principal investigators from Malawi and

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3 1 Ireland. This was followed by reactions from stakeholders and selection of the ARG from the
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6 2 stakeholders' present. The discussions with the ARG, informed the proposed research phases
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8 3 (Table 1):
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13 5 The nature of action research is that the methodology of the group is decided upon by the group
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15 6 and is likely to change and evolve as they address different issues.²⁵ Following an action research
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17 7 approach, the group will thus **plan** what to do – take clear and specific **action** – **observe** and collect
18
19 8 data on the consequences of this action – and as a group **reflect** on the implications for designing
20
21 9 policy to and systems to promote access to AT. In order to conduct preparatory work, we will
22
23 10 conduct a literature review of academic and grey literature in assistive technology in Malawi and
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25 11 review data available from existing datasets. In addition, we will conduct interviews with users and
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27 12 providers of AT guided by the data from a Country Capacity assessment by the Clinton Health
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29 13 Access Initiative (CHAI) in partnership with the Assistive Technology 2030 project. The research
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31 14 team will also assess inclusivity of the process of policy development and implementation in
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33 15 existing policies using the EquIPP (Equity and Inclusion in Policy Processes) tool.³² The EquIPP
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35 16 ³² tool was developed with the United Nations Partnership on the Rights of Persons with
36
37 17 Disabilities (UNPRPD) and measures, evaluates and makes recommendations for improvement
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39 18 in regard to inclusive policy development and evaluation. It consists of 17 Key Actions that provide
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41 19 guidance on how to ensure an equitable and inclusive policy development process.
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51 21 Phase 2 – Policy Development: Phase 2 will focus on the development of a draft policy, guided by
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53 22 the EquIPP framework for inclusive policy development. A theory of change³³ will be undertaken
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3 1 to guide the APL development while Force Field Analysis³⁴ to explore the political economy and
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6 2 power relationships on AT in Malawi will be conducted. Force Field Analysis³⁴ is a qualitative
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8 3 research method that conceptualises how forces for and against change are poised and thus
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10 4 helps in the systematic analysis of possible change processes. Bourdesian Analysis³⁵ applies
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12 5 the idea of the social space being composed of fields of identify and power relations which are
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15 6 likely to influence change process.
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20 8 The ARG will design a Draft AT Policy, supported by the research team, drawing on the literature
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22 9 reviewed above and taking into account the Malawian context. It is anticipated that the resultant
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25 10 draft may also be assessed for the degree to which it promotes inclusivity (e.g. service users,
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27 11 gender, rurality, poverty, etc.) using the EquiFrame tool.³⁶ EquiFrame³⁶ which is a tool for
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30 12 Evaluating and Promoting the Inclusion of Vulnerable Groups and Core Concepts of Human
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32 13 Rights in Health Policy Documents. It consists of 21 Core Concepts that covers issues relating to
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35 14 universal, equitable and accessible healthcare.
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44 17 *Phase 3-System Development:* This phase involves the development of system strengthening
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46 18 recommendations based on knowledge and information generated from the policy development
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48 19 process. The ARG will also address what implications there are at the systems level for delivering
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50 20 on the Draft AT Policy; and to recommend how these can be addressed in the Malawian context.
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52 21 Data will be used to demonstrate the link between the different government ministries and
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54 22 stakeholders to the SDG matrix; and thus highlight the relevance of AT to achievement of the
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3 1 SDGs.⁴ The SDG Matrix will be used to demonstrate the concept that that assistive products have
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6 2 a direct impact on the achievement of the SGDs. Tebbutt and colleagues suggest that assistive
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8 3 products can be both mediators and moderators of SDG achievement ⁵ A network analysis^{37, 38}
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10 4 will be undertaken to explore the strength and nature of relationship between stakeholders on AT
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13 5 in Malawi. The collective leadership approach will be very useful in this phase to ensure collective
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15 6 impact and system development.³⁹
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20 8 *Phase 4- Implementation and Evaluation.* This phase marks the beginning of the implementation
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22 9 and evaluation of the AT policy developed. Over an agreed period, the participating government
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25 10 ministries and stakeholders will identify a suitable service provider to trial the implementation of
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27 11 the Draft AT Policy, with the support of the identified ministry and the research team. While the
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30 12 ARG will be in a continuing process of evaluation and feedback themselves, stakeholders who
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32 13 attended the project launch will be asked to attend a project review meeting where the ARG and
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34 14 research team will present findings. The ARG will also identify AT service users to present their
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37 15 experiences during this workshop. The SMART (Systems-Market for Assistive and Related
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39 16 Technologies) Thinking Matrix framework will be used during the implementation and
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42 17 evaluation.⁴⁰ The SMART Thinking Matrix is a framework for conceptualizing intersections
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44 18 between systems levels and market shaping for assistive technology and was derived from a
45
46 19 systematic review of the interface between these two literatures.⁴⁰
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51 21 *Phase 5-Knowledge Exchange.* This phase entails ensuring knowledge exchange impact of the
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54 22 research process. The ARG and the Research Team will use results from previous phases to
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1 identify key features that might be relevant for a generic National Framework for AT, that will be
2 generalised to other countries and contexts. In keeping with Action Research methodology, expert
3 advisers (all of whom we have worked with before) who will be available to provide support to the
4 ARG shall provide feedback on the research process. This support could be provided either
5 virtually or through attendance at project meeting in Malawi; as determined by the needs of the
6 ARG and the available budget of the project.

8 Action Research Methodology

9 Throughout the five phases described above, we will use an Action Research Methodology²⁵
10 informed by the needs of the ARG. This will take the form of Action Research Cycles each
11 consisting of four components: plan, act, observe, and reflect (Figure 3), to answer the research
12 questions which are posed by the ARG, and contribute to the development of each phase.

16 **Figure 3. Action Research Process**

18 Throughout these cycles, we will use multiple study methods to address the questions posed by
19 the ARG (Table 1). For each research methodology, specific study procedures (Table 1) to
20 produce requested content for use in the action research cycle will be decided with the ARG.

1

2 **Table 1: Planned and anticipated research methodology**

Research Phase	Methodology
<p>Phase 1 - Preparatory Work: Understanding the Assistive technology context in Malawi</p>	<ol style="list-style-type: none"> 1. Literature Review: Assistive technology service delivery and policy review using academic and grey literature 2. Data Review: Secondary data analysis of existing datasets (i.e. Census, SINTEF dataset) and interviews 3. Country Capacity Assessment: In collaboration with AT2030 and the Clinton Health Access Initiative 4. EquiPP: Review of existing policies for inclusive policy development processes
<p>Phase 2 – Policy Development: Identifying Key Change Agents and Contexts</p>	<ol style="list-style-type: none"> 5. EquiPP: Inclusive policy development process 6. Theory of Change: Development of theory of change for APL development 7. Field Analysis: Force Field Analysis and Bourdesian Analysis to understand political economy and power relationships
<p>Phase 3 - Systems Development: Engagement in Collective Leadership to Achieve the SDGs</p>	<ol style="list-style-type: none"> 8. SDG Matrix: Linking ministries to SDG achievement and role of AT 9. Network Analysis: Strength and nature of existing networks between key stakeholders in AT in Malawi
<p>Phase 4 – Implementation and Evaluation: Delivering a Policy</p>	<ol style="list-style-type: none"> 10. Systems Coherence Development: Addressing gaps in existing network to strengthen coherence for GATE 10Ps 11. Market Shaping Analysis: Smart Thinking Matrix

<p>or Strategy in Context</p>	<p>12. Piloting: Implementation of strategy in key areas with review of process and outcomes</p>
<p>Phase 5 – Knowledge Exchange: Applying Knowledge to the Global Context</p>	<p>13. Policy Framework: Identification of key concepts for broader applicability to other contexts</p> <p>14. Systems Implementation Framework: Specification of implementation system to be applied to other contexts</p>

Data collection and Management

All data including the transcripts will be stored according to the provisions of the Centre for Social Research, University of Malawi Research Practice and Procedures. Hence, all primary data will be held permanently following its acquisition and used in publication for the purpose of this study and recommendations of the ARG. All data will be anonymized, and informed consent will be obtained from all study participants and stakeholders at every stage of the research process. Study participants entail all who are recruited or invited to participate in the study and may include stakeholders who are users or providers of AT. A data dictionary will be kept and maintained for both quantitative and qualitative data to ensure that all authorized individuals are able to reuse the data. Secondary data will be obtained from National the Statistics Office and National Survey on living conditions of persons with disabilities (SINTEF).

Data Analysis

The data analysis method adopted will be dependent on the data type from the different phases of the study. Quantitative data will be reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines while qualitative data will be

1 reported using the Consolidated Criteria for Reporting Qualitative Research (COREQ).⁴¹ Analytic
2 review methods will be used for literature and document review in phases 1 and 5.⁴² For qualitative
3 data (From phases 1-5), content and framework analysis will be used. Both deductive and
4 inductive methods will be adopted by the research team to code available data, depending on the
5 nature of data and question posed by the ARG. Data coding will be conducted by independent
6 members of the research team and assessed for congruence, with differences resolved by the
7 research team. A process of thematic analysis will be subsequently used to identify main and sub
8 themes relevant for the study. For quantitative data (Phase 1, 2 and 3), descriptive statistics and
9 regression analysis will be undertaken to understand factors relevant for improved access to AT
10 and creation of a nation AT policy in Malawi.⁴²

11 The EquIPP and EquiFrame tools^{32, 36} will also be used to analyze existing policy on disability and
12 the proposed AT policy. Quantitative data will be analysed using the Statistical Package for the
13 Social Sciences (SPSS) version 23 while qualitative data will be analysed via *Atlas. ti version*
14 *7.5.18*. All data will be anonymized and not contain any personal identifiers.

16 Patient and Public Involvement

17 No patient involved

19 Ethics and Dissemination

20 Ethical approval was obtained from the Maynooth University Social Research Ethics Committee
21 (SRESC-2019- 2378566) and University of Malawi Research Ethics Committee (UNIMAREC)
22 (P.01/20/10).

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3 1 The results from the study will be disseminated through presentations at conferences both
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6 2 within Malawi and abroad with stakeholders in and at international conferences; and publishing
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8 3 in peer-reviewed journals and on the websites of Maynooth and University of Malawi
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14 5 Discussion

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16 6 The aim of APPLICABLE is to develop a national AT policy for Malawi and to contribute to the
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18 7 development of a framework in the process that may be relevant in other countries. Also, it is
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20 8 anticipated that the process will evolve a framework that will lead to strengthening of the AT
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22 9 ecosystem through collaborative action and partnership with all stakeholders.
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28 11 These objectives informed the adoption of the Action Research approach that sets out on a
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30 12 research path without specific research agenda but entrusts the direction of the research to
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32 13 local and informed actors on AT in Malawi, to ensure a shared research agenda and
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34 14 development of context useful knowledge. This approach is in line with the ethos of the Mission
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36 15 Oriented Approach for AT proposed by Albala and colleagues.²⁷ It also avoids the common
37
38 16 pitfall of most implementation research, where research is done for rather than with local
39
40 17 stakeholders. Also, the action research approach ensures the development of context specific
41
42 18 approaches for the development of APL for Malawi. Low income settings like Malawi have
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44 19 particular AT challenges that must take into consideration the local realities rather than
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46 20 adopting recommendations from high income settings with different socio-economic milieu.
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48 21 According to Gélinas-Bronsard and colleagues, accessing AT is a matter of resources.³⁰ While
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50 22 it is obvious that factors outside finance play a role in the access and utilization of AT, its
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3 1 pivotal role in LMICS, where health care insurance and social welfare packages are absent,
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6 2 is a key issue that the action research approach must explicitly address.
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10 4 The Collective Leadership approach will help to ensure all stakeholders engaged in the action
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13 5 research approach feel a sense of ownership and promote buy-in at all levels in the
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15 6 implementation phase. Historically, in Malawi and in other countries, a single ministry
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17 7 maintains responsibility for the development and implementation of policy – considered the
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19 8 policy holder. In this case, either the ministry of Health or Gender and disability or Education
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21 9 may desire to claim ownership on account of perceived ‘proximity’ of AT to their ministry.
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25 10 However, AT is more than just a health issue, or disability problem as shown by data from our
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27 11 SDG matrix. It cuts across various sectors such as education, sports and therefore require
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29 12 collaborative approach. As shown by Tebbut and colleagues, AT is relevant for the
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31 13 achievement of each of the 17 SDGs;⁵ hence requires cross cutting collaboration between all
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33 14 players in Malawi. Interestingly, the collective leadership approach is noted to be useful for
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35 15 changing policy where many stakeholders exist and led to relevant policy changes in infant
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37 16 and young child feeding policies in seven countries in Southeast Asia.²⁹ Similarly, a systematic
38
39 17 review by De Brun and colleagues showed that collectivistic leadership was associated
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41 18 positive outcomes in health care settings in Europe and North America.²⁸ It is pertinent to note
42
43 19 that in order to solve social problems and achieve collective impact, commitment of all relevant
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45 20 actors is crucial³⁹. This integration between systems thinking and market shaping approach
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47 21 presents as practical and viable option to increase access to AT.⁴⁰
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3 1 The strength of this study lies in its reliance on the Action Research method which ensures active
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6 2 participation of all stakeholders. Yet, the task of managing the interest of the 'many' and ensuring
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8 3 that every opinion '*counts*' may be the big challenge of the research process. We hope to address
9
10 4 these through action learning and transdisciplinary approaches recommended for use in assistive
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13 5 technology projects.²⁶
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18 7 Gaps between research and practice or policy and practice gaps are some of the persistent
19
20 8 problems in disability studies. In adopting an action research process, we intend to avoid these
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22 9 gaps to evolve a participatory and innovative process leading to development of an implementable
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25 10 AT policy in Malawi. The benefits of an AT policy in Malawi are numerous. However, a realistic
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28 11 and implementable policy would overcome the limitations of past policies on disability in Malawi
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30 12 that failed to address the health and social challenges of PWD. APPLICABLE presents as an
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33 13 opportunity to demonstrate an innovative and participatory way of policy development that may
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35 14 be adapted for use in other settings.
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2 We are grateful to the members of APPLICABLE action research group and all stakeholders
3 involved in the formative research process.

4 Author Contributions

5 IDE and MM conceptualized the protocol with significant contributions from EMS and AM. IDE
6 wrote the initial draft which was reviewed by EMS, JK, MZJ, AM and MM. All authors read and
7 approved the final version of the manuscript.

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13 Competing interests

14 None declared.

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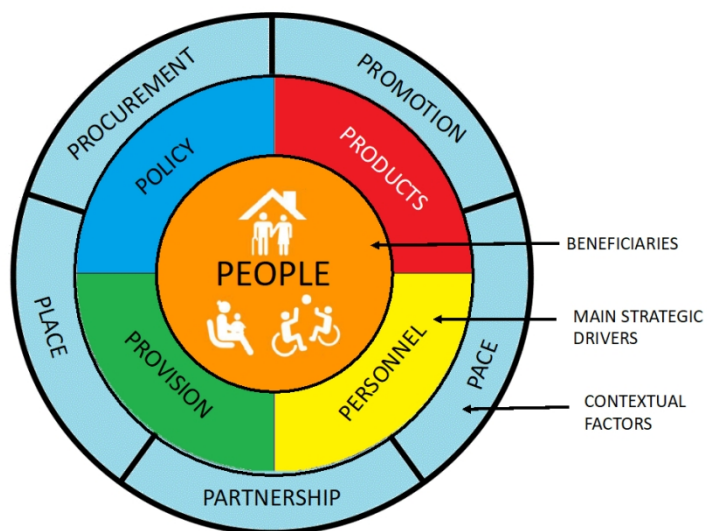
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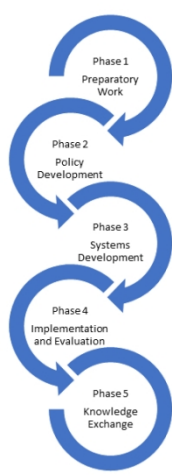
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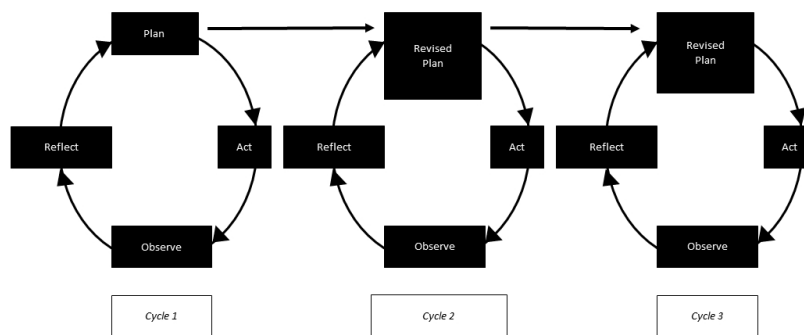
The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan & Scherer, 2018, with permission)

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APPLICABLE research phases
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Action Research Process

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BMJ Open

Implementation of the Assistive Product List (APL) in Malawi through development of appropriate policy and systems: An Action Research Protocol

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2020-040281.R3
Article Type:	Protocol
Date Submitted by the Author:	11-Oct-2020
Complete List of Authors:	Ebuenyi, Ikenna; National University of Ireland Maynooth, Psychology Smith, Emma; National University of Ireland Maynooth, Psychology Kafumba, Juba; University of Malawi, Centre for Social Research Jamali, Monica; University of Malawi, Centre for Social Research Munthali, Alister; University of Malawi, Centre for Social Research MacLachlan, Malcolm ; National University of Ireland Maynooth, Psychology
Primary Subject Heading:	Public health
Secondary Subject Heading:	Global health, Health policy, Health services research, Rehabilitation medicine
Keywords:	REHABILITATION MEDICINE, PUBLIC HEALTH, SOCIAL MEDICINE, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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3 1 Implementation of the Assistive Product List (APL) in Malawi through development of
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6 2 appropriate policy and systems: An Action Research Protocol
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16 [Abstract](#)

17 [Introduction](#)

18 Assistive Technology (AT) is important for the achievement of the Sustainable Development Goals
19 (SDGs) for persons with disabilities (PWD). Increasingly, studies suggest a significant gap
20 between the need for and demand for and provisions of AT for PWD in low- and middle-income
21 settings. Evidence from high income countries highlights the importance of robust AT policies to
22 the achievement of the recommendations of the World Health Assembly on AT. In Malawi, there

For peer review only

1 is no standalone AT policy. The objectives of the priority Assistive Product list Implementation
2 Creating Enablement of inclusive SDGs (APPLICABLE) project, are to propose and facilitate the
3 development of a framework for creating effective national Assistive Technology (AT) policy and
4 specify a system capable of implementing such policies in low-income countries such as Malawi.

5 **Method and analysis**

6 We propose an action research process with stakeholders in AT in Malawi. APPLICABLE will
7 adopt an action research paradigm, through developing a shared research agenda with
8 stakeholders and including users of AT. This involves the formation of an Action Research Group
9 (ARG) that will specify the priorities for practice - and policy-based evidence, in order to facilitate
10 the development of contextually realistic and achievable policy aspirations on AT in Malawi and
11 provide system strengthening recommendations that will ensure that the policy is implementable
12 for their realization. We will undertake an evaluation of this policy by measuring supply and support
13 for specific AT prior to, and following the implementation of the policy recommendations.

14 **Ethics and Dissemination**

15 The study protocol was approved by Maynooth University Research Ethics Committee (SRESC-
16 2019- 2378566) and University of Malawi Research Ethics Committee (P.01/20/10). Findings from
17 the study will be disseminated by publication in peer-reviewed journals, presentations to
18 stakeholders in Malawi, Ireland, and international audiences at international conferences.

19
20 **Keywords:** Action Research, Assistive Technology Policy, Assistive Product List, Collective
21 Leadership, Malawi

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56 2 **Strength and Limitations of this Study**

8 3 ➤ This study will be the first in Africa to explore the development of a national Assistive
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10 4 Technology policy and Assistive Product list in response to the recommendations of the
11
12 5 WHO.

15 6 ➤ The framework developed from this study, will lead to strengthening of the Assistive
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17 7 Technology ecosystem in Malawi and may be relevant in other countries with similar
18
19 8 interest.

22 9 ➤ Using an emergent and action learning approach strengthens both the methods and
23
24 10 reflexivity of the research process and ensures active participation of all stakeholders.

27 11 ➤ The use of a flexible research methodology may lead to researcher bias and deviation from
28
29 12 the initial objectives may occur on account of the reliance on the contribution from multiple
30
31 13 stakeholders.

34 14 ➤ The proposed principle of collective leadership may be a hard sell to the stakeholders in
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36 15 government who are used to the traditional single ministry lead in policy development.
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1 Introduction

2 Persons with disabilities (PWD) often experience overt and covert barriers to participation in
3 society and exercise of their rights.¹ These experiences of deprivation have dire implications
4 for PWD, depending on their location and type of impairment. This realization has led to
5 various efforts at both national and international level to ensure the reduction and elimination
6 of the deprivation experience by PWD.^{1, 2} The United Nations Convention on the Rights of
7 Persons with Disabilities (UN CRPD) and the Sustainable Development Goals (SDGs)
8 emphasize the importance of inclusion for PWD.^{3, 4} The SDGs highlight the importance of
9 social inclusion through the slogan- 'leave no one behind'.

10
11 Assistive Technology (AT) is pivotal to achieving this mandate of inclusion of PWD.^{4, 5} AT is a
12 'subset of health technology systems and refers to "the development and application of
13 organised knowledge, skills, procedures, and policies relevant to the provision, use, and
14 assessment of assistive products".⁶ while an assistive product is "any product (including
15 devices, equipment, instruments, and software), either specially designed and produced or
16 generally available, whose primary purpose is to maintain or improve an individual's
17 functioning and independence and thereby promote their wellbeing".⁶ Common examples of
18 assistive products in different impairment domains include wheelchairs, white canes, hearing
19 aids, communication boards and calendar pill boxes. In 2014, the WHO established the Global
20 Cooperation on Assistive Technology (GATE) in order to address the global need for AT.⁷
21 One of the first tasks for GATE was to establish a Priority Assistive Product List (APL)⁸ which
22 called for countries to develop their own context specific national APL, similar to the WHO

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3 1 Essential medicines list.⁹ The APL is not restrictive but a guide provided by GATE for countries
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6 2 to use in identifying national AT needs and priorities.⁸
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10 4 In a bid to improve access to AT , GATE recommended five priority (5Ps) themes, namely
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12
13 5 people, policy, products, provision and personnel.⁸ That schema put *people*, or users of AT,
14
15 6 at the centre and policy, products, provision and personnel, as strategic points of action to
16
17 7 improve access to AT around the world. In a series of position papers from the Global
18
19 8 Research, Innovation and Education on Assistive Technology (GREAT) summit organized by
20
21 9 GATE, people were identified as important drivers in AT access;¹⁰ context sensitive products
22
23 10 were considered relevant for AT accessibility;¹¹ the development of an international standard
24
25 11 for provision of AT was seen as important for service user safety,¹² and the certification of
26
27 12 competency for AT personnel as important for staff training,¹³ along with an inclusive
28
29 13 development of national AT policies, all to improve access to AT.¹⁴ Along with these papers,
30
31 14 an additional 5 Ps – specifically referring to the context of AT services were also identified as
32
33 15 emergent from the discussions at the Summit (see Figure 1) The additional 5Ps include
34
35 16 Procurement, Place, Pace, Promotion and Partnership; and are key situational factors for
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37 17 systems in diverse context. These situate the previous 5 Ps in national and local contexts that
38
39 18 determine access to AT. For instance, to ensure that *Procurement* or purchasing AT products
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41 19 occur at national level in line with national and contextual factors that take into account *Place*
42
43 20 or differences in local settings; at a *Pace* that is feasible and can be absorbed within the
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45 21 systems' capacity, using context sensitive methods to *promote* positive images of AT users
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47 22 and with cross cutting *partnerships*.¹⁵
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6 2 **Figure 1: The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan**
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8 3 **& Scherer, 2018, with permission)**
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13 5 Sterman suggests that it is not a lack of resources, technical knowledge or commitment that
14
15 6 prevents us from making improvements in public health services but rather, “What thwarts us
16
17 7 is our lack of meaningful systems thinking capability”.¹⁶ Specifically in relation to AT,
18
19 8 MacLachlan and Scherer argue that “a systems thinking approach allows for a meaningful
20
21 9 linking of components and processes, a more realistic understanding of why and where
22
23 10 initiatives might fail or succeed, and a more satisfying way of placing the user of assistive
24
25 11 technology at the centre of ideas, activities and outcomes.”¹⁵
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32 13 **The Malawi Context**
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34 14 Increasingly, studies suggest low demand and provision of Assistive Technology (AT) for
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36 15 PWD in low- and middle-income settings.¹⁷ Malawi is a Southern African country with a
37
38 16 population of about 18 million. The economy is largely agrarian, and the government depends
39
40 17 on foreign aid. Malawi ranks 172 out 189 countries based on the United Nations Human
41
42 18 Development Index.¹⁸ In Malawi, there are several policies and strategies at the national level
43
44 19 which are relevant to the experiences of PWD, each which should have relevance to AT.
45
46 20 Notably, the National Policy on the Equalization of Opportunities for PWD ¹⁹ and National
47
48 21 Disability Mainstreaming Strategy and Implementation Plan;²⁰ yet there are no clear direction
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50 22 guidelines on how AT should be provided in the country ²⁰. It is pertinent to state that the
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3 1 National Policy on the Equalization of Opportunities for Persons with Disabilities was adopted
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6 2 in 2006; and processes are underway to develop a successor plan on account of its expiration.
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8 3 In Malawi, there is a huge gap between the need and access to services PWD.²¹ Although
9
10 4 about 69% of PWD need assistive devices in Malawi, only 5% have access to them.²²
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13 5 Evidence from high income countries highlights the importance of robust AT policies for the
14
15 6 achievement of the recommendations of the WHA on AT.²³ In Malawi, there is no standalone
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17 7 AT policy.²⁴
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23 9 The objectives of the Assistive Product List Implementation Creating Enablement of inclusive
24
25 10 SDGs (APPLICABLE) project are (i) to propose and facilitate the development of *a framework*
26
27 11 for creating effective national Assistive Technology (AT) policy and (ii) *specify a system*
28
29
30 12 capable of implementing that policy in Malawi.
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33 13 [Methods and Analysis](#)

34 14 [Approach](#)

35
36
37 15 The study will adopt an action research approach²⁵ and shared research agenda in
38
39 16 collaboration with AT stakeholders in Malawi to achieve the study objectives. Hence, this
40
41 17 research protocol is based on a proposed research plan by the research teams at Maynooth
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43
44 18 University and the University of Malawi and the discussions held during the project launch and
45
46 19 formation of an Action Research Group (ARG) in Malawi.
47
48
49 20 The relevance of action research for solving persistent problems has been extensively reported.²⁵
50
51 21 Boger et al recommend collaborative transdisciplinary approach for solving persistent problems
52
53 22 in AT.²⁶ In adopting this method, we aim to ensure that the process of AT policy development is
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56 23 participatory, collaborative and undertaken through a transparent and reflexive process with
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1 relevant stakeholders in Malawi. Equally essential is the relevance of the action research paradigm
2 to the systems-thinking and mission-oriented approach which are central to the objectives of
3 APPLICABLE. A systems thinking approach will ensure APPLICABLE focuses on the range of
4 Ps (described above) to bridge the AT systems Gap in Malawi.^{15, 27} 'Collective leadership'^{28, 29} will
5 be a guiding principle for the research, whereby all the participating ministries and other major
6 stakeholders, take active leadership in the project in order to engender collective impact which is
7 supported by research. Collective leadership refers to a group of people working together to
8 achieve a set goal.^{28, 29} In this case, we envision co-construction of leadership and shared
9 responsibility by different stakeholders involved in AT in Malawi.³⁰ According to De Bruin et al.,
10 collective leadership was associated with improved communication and role clarity, greater
11 willingness to adopt leadership roles and 'give and take' by leaders, who became more willing to
12 share leadership responsibilities.²⁸ Also, Michaud-Létourneau suggest that the approach is useful
13 for changing policy where many stakeholders exist.²⁹ We will strive to minimize power imbalances
14 and the pitfalls of collective leadership by continuous learning and knowledge sharing to co-
15 construct what works for everyone through reflective dialogues.³¹

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18 The specific research methods described below are tactical and will be decided with the ARG in
19 an iterative process through a series of five phases, each comprised of Action Research Cycles.
20 The content for each of those action research cycles will be decided with key stakeholders in AT
21 in Malawi through the formation of an ARG.

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5 2 **Formative Research**
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7 3 Prior to the project launch, a series of steps were undertaken as part of the formative research
8
9 4 process. Initial meetings were held with the Ministries of Gender, Children, Disability and Social
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11 5 Welfare (MoGCD&SW), Health, Education, and Labour, Disabled People's Organisations, other
12
13 6 civil society, service providers, donors, industry and UN agencies. Presentation and discussions
14
15 7 on establishing a AT policy and implementation systems in Malawi were discussed and the
16
17 8 stakeholders expressed interest in the 36 months (January 2019-December 2021) project.

19 9 The project launch was held on the 6th of December 2019 with over 40 stakeholders drawn from
20
21 10 five broad stakeholder groups namely:

- 26 11 1. Government Stakeholders (e.g. Ministries of Health, Education, Gender and Persons with
27
28 12 Disabilities and the Elderly)
- 31 13 2. Non-governmental non-profit stakeholders (e.g. Federation of Disability Organization in
32
33 14 Malawi (FEDOMA), Beit Cure International Hospital (BT), Malawi Council for the
34
35 15 Handicapped (MACOHA))
- 38 16 3. Non-governmental for-profit stakeholders (Pharmacist, Physiotherapist)
- 40
41 17 4. Academic Institutions
- 42
43 18 5. United Nation agencies (e.g. UNICEF, WHO, UNDP)

45 19 It is pertinent to state that persons with disabilities and users AT products are not restricted to only
46
47 20 group two but are also in the other groups. They are involved in all the research processes and
48
49 21 as part of the ARG.

52 22 The formative research stage describes activities undertaken prior to the project launch. The
53
54 23 following sections describe the proposed research phases developed following the project launch.

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6 2 **Research Phases**
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8 3 The study will be conducted in five phases. The details of each phase will be collaboratively
9
10 4 decided during the action research project, but these phases will guide the work throughout the
11
12 5 project.

13
14 6 The five phases of the research are Preparatory Work, Policy Development, Systems
15
16 7 Development, Implementation and Evaluation, and Knowledge Exchange (Figure 2).
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24 10 **Figure 2: APPLICABLE research phases**
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29 12 *Phase 1- Preparatory Work.* This stage starts with the project launch and formation of the Action
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31 13 Research Group (ARG). Following the project launch, 15 persons were invited from the
32
33 14 stakeholders present to join the ARG. Members of the ARG have been purposively selected to
34
35 15 work on the policy development and implementation.

36
37
38 16 The ARG adopted the proposed process and agreed that:

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41 17
 - A realistic AT policy and delivery system is needed in Malawi; and
 - That ownership of the policy will be further discussed and that initially it will be co-led by

42
43 18 members of the Action Research Group; and

44
45 19

 - Data will be stored at the Centre for Social Research, Malawi.

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50 21 The launch was organized in collaboration with Clinton Health Access Initiative (CHAI) who
51
52 22 previously conducted a baseline survey on AT in Malawi. They presented the results on their
53
54 23 survey, after which APPLICABLE was introduced by the Principal investigators from Malawi and

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2
3 1 Ireland. This was followed by reactions from stakeholders and selection of the ARG from the
4
5
6 2 stakeholders' present. The discussions with the ARG, informed the proposed research phases
7
8 3 (Table 1):
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13 5 The nature of action research is that the methodology of the group is decided upon by the group
14
15 6 and is likely to change and evolve as they address different issues.²⁵ Following an action research
16
17 7 approach, the group will thus **plan** what to do – take clear and specific **action** – **observe** and collect
18
19 8 data on the consequences of this action – and as a group **reflect** on the implications for designing
20
21 9 policy to and systems to promote access to AT. In order to conduct preparatory work, we will
22
23 10 conduct a literature review of academic and grey literature in assistive technology in Malawi and
24
25 11 review data available from existing datasets. In addition, we will conduct interviews with users and
26
27 12 providers of AT guided by the data from a Country Capacity assessment by the Clinton Health
28
29 13 Access Initiative (CHAI) in partnership with the Assistive Technology 2030 project. The research
30
31 14 team will also assess inclusivity of the process of policy development and implementation in
32
33 15 existing policies using the EquIPP (Equity and Inclusion in Policy Processes) tool.³² The EquIPP
34
35 16 ³² tool was developed with the United Nations Partnership on the Rights of Persons with
36
37 17 Disabilities (UNPRPD) and measures, evaluates and makes recommendations for improvement
38
39 18 in regard to inclusive policy development and evaluation. It consists of 17 Key Actions that provide
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41 19 guidance on how to ensure an equitable and inclusive policy development process.
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51 21 Phase 2 – Policy Development: Phase 2 will focus on the development of a draft policy, guided by
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53 22 the EquIPP framework for inclusive policy development. A theory of change³³ will be undertaken
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3 1 to guide the APL development while Force Field Analysis³⁴ to explore the political economy and
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5
6 2 power relationships on AT in Malawi will be conducted. Force Field Analysis³⁴ is a qualitative
7
8 3 research method that conceptualises how forces for and against change are poised and thus
9
10 4 helps in the systematic analysis of possible change processes. Bourdesian Analysis³⁵ applies
11
12 5 the idea of the social space being composed of fields of identify and power relations which are
13
14
15 6 likely to influence change process.
16
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20 8 The ARG will design a Draft AT Policy, supported by the research team, drawing on the literature
21
22 9 reviewed above and taking into account the Malawian context. It is anticipated that the resultant
23
24
25 10 draft may also be assessed for the degree to which it promotes inclusivity (e.g. service users,
26
27 11 gender, rurality, poverty, etc.) using the EquiFrame tool.³⁶ EquiFrame³⁶ which is a tool for
28
29
30 12 Evaluating and Promoting the Inclusion of Vulnerable Groups and Core Concepts of Human
31
32 13 Rights in Health Policy Documents. It consists of 21 Core Concepts that covers issues relating to
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34
35 14 universal, equitable and accessible healthcare.
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44 17 *Phase 3-System Development:* This phase involves the development of system strengthening
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46 18 recommendations based on knowledge and information generated from the policy development
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48 19 process. The ARG will also address what implications there are at the systems level for delivering
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50 20 on the Draft AT Policy; and to recommend how these can be addressed in the Malawian context.
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52 21 Data will be used to demonstrate the link between the different government ministries and
53
54 22 stakeholders to the SDG matrix; and thus highlight the relevance of AT to achievement of the
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3 1 SDGs.⁴ The SDG Matrix will be used to demonstrate the concept that that assistive products have
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5
6 2 a direct impact on the achievement of the SGDs. Tebbutt and colleagues suggest that assistive
7
8 3 products can be both mediators and moderators of SDG achievement ⁵ A network analysis^{37, 38}
9
10 4 will be undertaken to explore the strength and nature of relationship between stakeholders on AT
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12
13 5 in Malawi. The collective leadership approach will be very useful in this phase to ensure collective
14
15 6 impact and system development.³⁹
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20 8 *Phase 4- Implementation and Evaluation.* This phase marks the beginning of the implementation
21
22 9 and evaluation of the AT policy developed. Over an agreed period, the participating government
23
24
25 10 ministries and stakeholders will identify a suitable service provider to trial the implementation of
26
27 11 the Draft AT Policy, with the support of the identified ministry and the research team. While the
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29
30 12 ARG will be in a continuing process of evaluation and feedback themselves, stakeholders who
31
32 13 attended the project launch will be asked to attend a project review meeting where the ARG and
33
34 14 research team will present findings. The ARG will also identify AT service users to present their
35
36
37 15 experiences during this workshop. The SMART (Systems-Market for Assistive and Related
38
39 16 Technologies) Thinking Matrix framework will be used during the implementation and
40
41
42 17 evaluation.⁴⁰ The SMART Thinking Matrix is a framework for conceptualizing intersections
43
44 18 between systems levels and market shaping for assistive technology and was derived form a
45
46 19 systematic review of the interface between these two literatures.⁴⁰
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51 21 *Phase 5-Knowledge Exchange.* This phase entails ensuring knowledge exchange impact of the
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54 22 research process. The ARG and the Research Team will use results from previous phases to
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1 identify key features that might be relevant for a generic National Framework for AT, that will be
2 generalised to other countries and contexts. In keeping with Action Research methodology, expert
3 advisers (all of whom we have worked with before) who will be available to provide support to the
4 ARG shall provide feedback on the research process. This support could be provided either
5 virtually or through attendance at project meeting in Malawi; as determined by the needs of the
6 ARG and the available budget of the project.

8 Action Research Methodology

9 Throughout the five phases described above, we will use an Action Research Methodology²⁵
10 informed by the needs of the ARG. This will take the form of Action Research Cycles each
11 consisting of four components: plan, act, observe, and reflect (Figure 3), to answer the research
12 questions which are posed by the ARG, and contribute to the development of each phase.

16 **Figure 3. Action Research Process**

18 Throughout these cycles, we will use multiple study methods to address the questions posed by
19 the ARG (Table 1). For each research methodology, specific study procedures (Table 1) to
20 produce requested content for use in the action research cycle will be decided with the ARG.

1

2 **Table 1: Planned and anticipated research methodology**

Research Phase	Methodology
Phase 1 - Preparatory Work: Understanding the Assistive technology context in Malawi	<ol style="list-style-type: none"> 1. Literature Review: Assistive technology service delivery and policy review using academic and grey literature 2. Data Review: Secondary data analysis of existing datasets (i.e. Census, SINTEF dataset) and interviews 3. Country Capacity Assessment: In collaboration with AT2030 and the Clinton Health Access Initiative 4. EquiPP: Review of existing policies for inclusive policy development processes
Phase 2 – Policy Development: Identifying Key Change Agents and Contexts	<ol style="list-style-type: none"> 5. EquiPP: Inclusive policy development process 6. Theory of Change: Development of theory of change for APL development 7. Field Analysis: Force Field Analysis and Bourdesian Analysis to understand political economy and power relationships
Phase 3 - Systems Development: Engagement in Collective Leadership to Achieve the SDGs	<ol style="list-style-type: none"> 8. SDG Matrix: Linking ministries to SDG achievement and role of AT 9. Network Analysis: Strength and nature of existing networks between key stakeholders in AT in Malawi
Phase 4 – Implementation and Evaluation: Delivering a Policy	<ol style="list-style-type: none"> 10. Systems Coherence Development: Addressing gaps in existing network to strengthen coherence for GATE 10Ps 11. Market Shaping Analysis: Smart Thinking Matrix

<p>or Strategy in Context</p>	<p>12. Piloting: Implementation of strategy in key areas with review of process and outcomes</p>
<p>Phase 5 – Knowledge Exchange: Applying Knowledge to the Global Context</p>	<p>13. Policy Framework: Identification of key concepts for broader applicability to other contexts</p> <p>14. Systems Implementation Framework: Specification of implementation system to be applied to other contexts</p>

Data collection and Management

All data including the transcripts will be stored according to the provisions of the Centre for Social Research, University of Malawi Research Practice and Procedures. Hence, all primary data will be held permanently following its acquisition and used in publication for the purpose of this study and recommendations of the ARG. All data will be anonymized, and informed consent will be obtained from all study participants and stakeholders at every stage of the research process. Study participants entail all who are recruited or invited to participate in the study and may include stakeholders who are users or providers of AT. A data dictionary will be kept and maintained for both quantitative and qualitative data to ensure that all authorized individuals are able to reuse the data. Secondary data will be obtained from National the Statistics Office and National Survey on living conditions of persons with disabilities (SINTEF).

Data Analysis

The data analysis method adopted will be dependent on the data type from the different phases of the study. Quantitative data will be reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines while qualitative data will be

1
2
3 1 reported using the Consolidated Criteria for Reporting Qualitative Research (COREQ).⁴¹ Analytic
4
5 2 review methods will be used for literature and document review in phases 1 and 5.⁴² For qualitative
6
7 3 data (From phases 1-5), content and framework analysis will be used. Both deductive and
8
9 4 inductive methods will be adopted by the research team to code available data, depending on the
10
11 5 nature of data and question posed by the ARG. Data coding will be conducted by independent
12
13 6 members of the research team and assessed for congruence, with differences resolved by the
14
15 7 research team. A process of thematic analysis will be subsequently used to identify main and sub
16
17 8 themes relevant for the study. For quantitative data (Phase 1, 2 and 3), descriptive statistics and
18
19 9 regression analysis will be undertaken to understand factors relevant for improved access to AT
20
21 10 and creation of a nation AT policy in Malawi.⁴²

22
23 11 The EquIPP and EquiFrame tools^{32, 36} will also be used to analyze existing policy on disability and
24
25 12 the proposed AT policy. Quantitative data will be analysed using the Statistical Package for the
26
27 13 Social Sciences (SPSS) version 23 while qualitative data will be analysed via *Atlas. ti version*
28
29 14 *7.5.18*. All data will be anonymized and not contain any personal identifiers.

30 31 32 33 34 35 36 37 38 39 16 Patient and Public Involvement

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41 17 Stakeholders that include users or providers of Assistive Technology were involved in the
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43 18 formative research process. These stakeholders who are also part of the ARG will be involved
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45 19 in all stages of the research including the dissemination of the results from the study.
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1 Ethics and Dissemination

2 Ethical approval was obtained from the Maynooth University Social Research Ethics Committee
3 (SRESC-2019- 2378566) and University of Malawi Research Ethics Committee (UNIMAREC)
4 (P.01/20/10).

5 The results from the study will be disseminated through presentations at conferences both
6 within Malawi and abroad with stakeholders in and at international conferences; and publishing
7 in peer-reviewed journals and on the websites of Maynooth and University of Malawi

9 Discussion

10 The aim of APPLICABLE is to develop a national AT policy for Malawi and to contribute to the
11 development of a framework in the process that may be relevant in other countries. Also, it is
12 anticipated that the process will evolve a framework that will lead to strengthening of the AT
13 ecosystem through collaborative action and partnership with all stakeholders.

14
15 These objectives informed the adoption of the Action Research approach that sets out on a
16 research path without specific research agenda but entrusts the direction of the research to
17 local and informed actors on AT in Malawi, to ensure a shared research agenda and
18 development of context useful knowledge. This approach is in line with the ethos of the Mission
19 Oriented Approach for AT proposed by Albala and colleagues.²⁷ It also avoids the common
20 pitfall of most implementation research, where research is done for rather than with local
21 stakeholders. Also, the action research approach ensures the development of context specific
22 approaches for the development of APL for Malawi. Low income settings like Malawi have
23 particular AT challenges that must take into consideration the local realities rather than

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3 1 adopting recommendations from high income settings with different socio-economic milieu.
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6 2 According to Gélinas-Bronsard and colleagues, accessing AT is a matter of resources.³⁰ While
7
8 3 it is obvious that factors outside finance play a role in the access and utilization of AT, its
9
10 4 pivotal role in LMICS, where health care insurance and social welfare packages are absent,
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12
13 5 is a key issue that the action research approach must explicitly address.
14

15 6
16
17 7 The Collective Leadership approach will help to ensure all stakeholders engaged in the action
18
19 8 research approach feel a sense of ownership and promote buy-in at all levels in the
20
21 9 implementation phase. Historically, in Malawi and in other countries, a single ministry
22
23 10 maintains responsibility for the development and implementation of policy – considered the
24
25 11 policy holder. In this case, either the ministry of Health or Gender and disability or Education
26
27 12 may desire to claim ownership on account of perceived ‘proximity’ of AT to their ministry.
28
29 13 However, AT is more than just a health issue, or disability problem as shown by data from our
30
31 14 SDG matrix. It cuts across various sectors such as education, sports and therefore require
32
33 15 collaborative approach. As shown by Tebbut and colleagues, AT is relevant for the
34
35 16 achievement of each of the 17 SDGs;⁵ hence requires cross cutting collaboration between all
36
37 17 players in Malawi. Interestingly, the collective leadership approach is noted to be useful for
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39 18 changing policy where many stakeholders exist and led to relevant policy changes in infant
40
41 19 and young child feeding policies in seven countries in Southeast Asia.²⁹ Similarly, a systematic
42
43 20 review by De Brun and colleagues showed that collectivistic leadership was associated
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45 21 positive outcomes in health care settings in Europe and North America.²⁸ It is pertinent to note
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47 22 that in order to solve social problems and achieve collective impact, commitment of all relevant
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1 actors is crucial³⁹. This integration between systems thinking and market shaping approach
2 presents as practical and viable option to increase access to AT.⁴⁰
3
4 The strength of this study lies in its reliance on the Action Research method which ensures active
5 participation of all stakeholders. Yet, the task of managing the interest of the 'many' and ensuring
6 that every opinion '*counts*' may be the big challenge of the research process. We hope to address
7 these through action learning and transdisciplinary approaches recommended for use in assistive
8 technology projects.²⁶
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10
11
12 Gaps between research and practice or policy and practice gaps are some of the persistent
13 problems in disability studies. In adopting an action research process, we intend to avoid these
14 gaps to evolve a participatory and innovative process leading to development of an implementable
15 AT policy in Malawi. The benefits of an AT policy in Malawi are numerous. However, a realistic
16 and implementable policy would overcome the limitations of past policies on disability in Malawi
17 that failed to address the health and social challenges of PWD. APPLICABLE presents as an
18 opportunity to demonstrate an innovative and participatory way of policy development that may
19 be adapted for use in other settings.
20
21
22

20 Acknowledgement

21 We are grateful to the members of APPLICABLE action research group and all stakeholders
22 involved in the formative research process.

1 Author Contributions

2 IDE and MM conceptualized the protocol with significant contributions from EMS and AM. IDE
3 wrote the initial draft which was reviewed by EMS, JK, MZJ, AM and MM. All authors read and
4 approved the final version of the manuscript.

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8 COALESCE/2019/114.

10 Competing interests

11 None declared.

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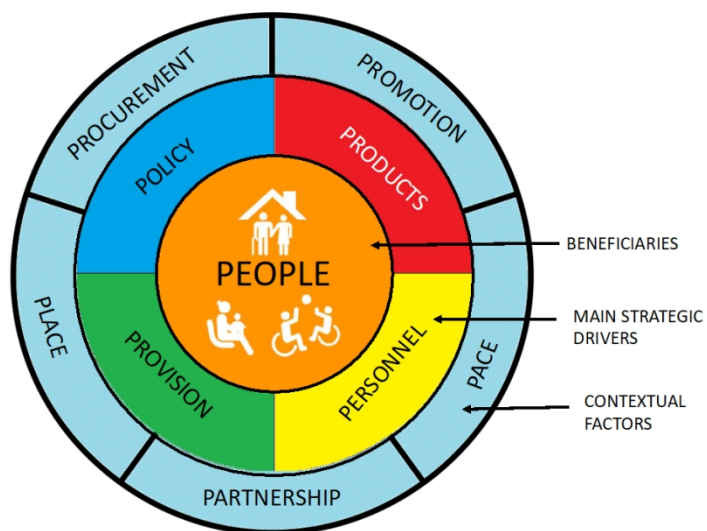
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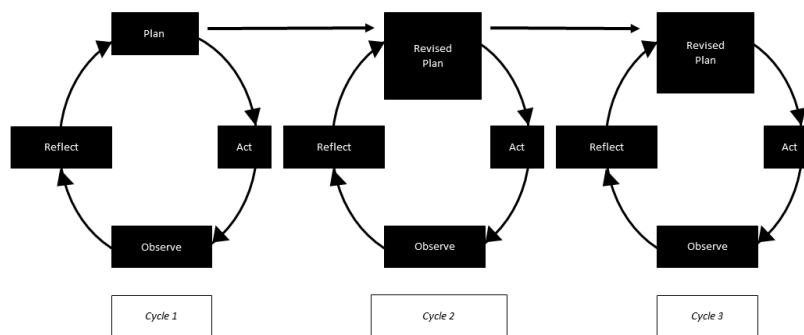
The 10 Ps of Systems Thinking for Assistive Technology Adapted from MacLachlan & Scherer, 2018, with permission)

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APPLICABLE research phases
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Action Research Process

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