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ORIGINAL RESEARCH



Exploring the inclusion of teaching and learning on assistive products in undergraduate curricula of health sciences faculties at three South African Universities

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ABSTRACT

Background: Providers must be knowledgeable on policy, systems and products to provide a person centred service and prescribe the most appropriate assistive product for each user.

Aim: This study aimed to determine to what extent teaching and learning on assistive products are included in undergraduate curricula of the Health science faculties at three universities in the Western Cape Province of South Africa.

Methods: Data were gathered through a cross sectional survey. Fifteen programmes were approached of whom eight participated. Information on teaching on assistive products was sourced from purposively identified key informants, through e-mail questionnaires. Descriptive analysis was done.

Results: A total of 104 assistive products were included in the eight programmes. Manual wheelchairs were the only product for which teaching was underscored by policy guidelines. Handheld mobility devices and wheelchairs were covered by five programmes. Teaching on assistive products for self-care, participation in domestic life, indoor and outdoor activities, employment and leisure was limited. Thirty seven products listed on the GATE List of 50 were taught by at least one of the programmes. Teaching and examination were theoretical in nature and occurred in professional silos. Clinical exposure was often incidental. For many products none of the four service delivery steps were covered.

Conclusion: Assistive products were included in all the participating undergraduate programmes. The range of included products and the level of training were insufficient to prepare graduates to effectively address user's needs. Newly appointed graduates will require early in-service training to ensure appropriate assistive product service delivery.

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Assistive products;
undergraduate teaching;
policy; provision; provider

► IMPLICATIONS FOR REHABILITATION

- Undergraduate teaching on assistive products is provided in professional silos.
- Not all products on the GATE APL of 50 are included in under graduate teaching.
- Teaching does not always ensure a proficiency level that will support graduates to provide an independent AT service.

Introduction

Both South Africa's National Development plan (NDP) [1] and the Western Cape provincial strategic plan [2] emphasise the importance of equity and eradicating poverty through affording everybody the opportunities to develop and flourish in an "open-opportunity society for all". Similarly, the Sustainable Development Goals (SDGs) [3] highlight the importance of leaving no one behind. Persons with impairments are often marginalised and struggle to access opportunities such as education and employment on par with their peers [4]. Amongst the myriad and complex reasons for this marginalisation is the lack of access to appropriate assistive products (AP) and services [5,6]. Not having appropriate assistive products can negatively impact realisation of each of the 17 SDGs for persons with impairments [7].

Assistive products (AP) "any external product[s] (including devices, equipment, instruments or software), especially produced or generally available, the primary purpose of which is to maintain

or improve an individual's functioning and independence, and thereby promote their well-being. AP are also used to prevent impairments and secondary health conditions" [8,9]. AP include a multitude of devices as classified in ISO 9999 [10], from a basic wooden cane to technologically advanced products such as computer software and microprocessor components in prostheses.

In South Africa (SA) and on the African continent demand for AP already far outstrips supply [11]. The need for assistive products and services will further increase due to population aging [12,13], ARVs increasing the life expectancy of people living with HIV/AIDS [14], the non-communicable disease burden, substance abuse, violence and trauma [15]. These conditions can result in impairments of numerous body structures and functions; many of which can be compensated for by AP. With the increased need assistive technology (AT) services is gradually being taken out of the narrow silo of disability into the broader realm of public health with a focus on function and participation [12].

Assistive technology (AT) is an encompassing term defined as “the application of organised knowledge and skills related to assistive products, including systems and services” [8,9]. AT is primarily about the users and their individual, unique experiences and needs [16]. Thus AT services must be accessible, culturally appropriate, meet the needs of the user and be governed by appropriate policy. Policies should be applicable to individual countries’ contexts and resources. They must also be linked to other national policies on achieving the SDGs. In order to ensure AT is user centred policies must be developed and implemented in consultation with persons with disabilities [17]. South African national policy requires the provision of AT and AP to be an integral part of healthcare service delivery from community level through to specialised services [18].

Service providers (personnel) must have knowledge of the relevant policy, systems, services and products ranging from basic, self-made low-cost to technologically advanced. They must have sufficient procedural and metacognitive knowledge on AT and AP in order not only to remember and understand in revised Bloom’s terms, but to apply, analyse and evaluate [19] (Table 1).

Provision of AP includes four steps i.e., assessment, procurement/fabrication (referred to as provision in this article), fitting, user training and maintenance and repair. In SA and Africa provision are hampered by environmental barriers (e.g., poverty, distance, rough terrain and lack of transport), disempowerment of users, lack of knowledge amongst policy makers and lack of policy implementation, funding and access, as well as to few and insufficiently trained service providers, poor collaboration and service delivery challenges [6,11]. These challenges can lead to under- or non-provision of products, little user training as well as poor follow up, maintenance and repair [20].

The WHO Global Cooperation on Assistive Technology (GATE) aims to improve access to assistive products and services as proclaimed by its vision, “a world where everyone in need has

high-quality, affordable assistive products to lead a healthy, productive and dignified life” [8, para. 3] through an international policy framework, research, a model for service delivery and provider training as well as a “priority assistive products list (APL)” list. The APL consists of a list of 50 products identified through general need and the effect these products can have on people’s lives. Governments are encouraged to make these products available for all citizens [21].

Healthcare professionals are responsible for the provision of AT and AP in SA and thus require comprehensive knowledge on both. However, discussions and course assignments in the post graduate programmes on rehabilitation and disability at the Centre for Rehabilitation Studies (CRS) at Stellenbosch University (SU) revealed that graduate students often had minimal knowledge of and engagement with AT and AP. Should this observation be accurate on a larger scale there is a need for appropriate inclusion of AT and AP in undergraduate curricula and a post graduate programme on AT and AP. This study aims to determine to what extent teaching and learning on AP are included in undergraduate curricula of health sciences faculties at three Western Cape Universities in order to identify areas that needs strengthening.

Methods

Data was gathered through a cross sectional survey at the health science faculties of the three universities. These faculties provide 15 under-graduate degree programmes in medicine, nursing, physiotherapy, occupational therapy, human nutrition and speech-and-language therapy (Table 2).

The 15 HODs of the respective programmes were invited via email to participate in the study. Data was sourced from key informants who were purposively identified by their HODs based on their knowledge of the study focus. Eleven HODs agreed for their departments to participate. One, a medicine programme, declined because their programme did not include AP. Three HODs did not respond to the email invitation despite follow up. Sixteen key informants from the 11 programmes were emailed of whom 10 from eight programmes participated in the study.

Data was collected through asynchronous email interviews as it is simple, saves time and money, allow informants to reflect on questions, and complete the questionnaire at their convenience [22]. The primary author’s contact details were provided in the email and could be approached to assist with completion of the questionnaire or explain aspects of the study that were unclear to participants. The primary author sought further information on responses from two participants through skype conversations.

The questionnaire explored the types of AT products included in curricula, teaching on services related to the products and the purpose of the product, level of learning, clinical exposure, and

Table 1. Bloom’s revised taxonomy (adapted from: Krathwohl [19]).

Level	Concept	Explanation
1	Mentioned	Not expected to remember or know about
2	Remembering	Recalling information, recognising, listing, describing, retrieving, naming.
3	Understanding	Explaining ideas or concepts, interpreting, summarising, paraphrasing, classifying.
4	Applying	Using information in another familiar situation, implementing, carrying out, executing
5	Analysing	Breaking information into parts to explore understandings and relationships, comparing, organising, deconstructing, interrogating
6	Evaluating	Justifying a decision or course of action, checking, hypothesising, critiquing, experimenting, judging
7	Creating	Generating new ideas, products, or ways of viewing things. Designing, constructing, planning, producing, inventing.

Table 2. Undergraduate programmes at each of the study universities.

University	Number of undergraduate degree programmes	Programmes	Number of programmes that participated	Number of key informants that participated
University A	5	Speech, language and hearing therapy; Occupational therapy, Physiotherapy; Medicine; Nursing	2	2
University B	6	Speech, language and hearing therapy; Occupational therapy, Physiotherapy, Human nutrition; Medicine; Nursing	4	6
University C	4	Occupational therapy, Physiotherapy, Human nutrition; Nursing	2	2
Total	15		8	10

formal assessment. The questionnaire was self-developed by the research team and had not been tested for reliability and validity.

Key informants were emailed information on ethical registration, institutional permission, a synopsis of the study, an informed consent leaflet and a questionnaire. Returning the completed questionnaire constituted informed consent. Two email reminders were sent to non-responders after which it was assumed that the informant chose not to participate in the study.

Categorical data was coded and entered onto an Excel spreadsheet and descriptively analysed.

Ethical considerations

The study was registered with the Health Research Ethics committee of Stellenbosch University (N18/09/096) and through a reciprocal review process by the Human Research Ethics Committee at the University of Cape Town (N18/09/096). All three universities provided institutional permission to perform the study at the health science faculties. Permission was sought from the relevant HODs and informed consent from participants before data was collected. Participation in the study was voluntary. To protect confidentiality, each key informant was individually emailed. Copies of emails are retained on servers of the sending account [22] and this may impact on confidentiality.

Limitations

Non-responders [23] limited the study scope as two programmes i.e., medicine and nursing are not represented in the data.

Results

Results were obtained from occupational therapy (2), speech language and hearing therapy (2), physiotherapy (3) and human nutrition programmes (1). A total of 104 AP were included in the eight programmes, covering 9 of the 12 ISO classes (Table 3). Thirty eight of the 50 products listed on the GATE APL were taught by at least 1 of the programmes. The majority of these were covered by one programme (Table 4). The three ISO classes not included by any of the programmes were assistive products for education and training, assistive products for work activities and participation in employment and assistive products for recreation and leisure.

The most common ISO class reported was "Assistive products related to personal mobility and transportation". The common products listed in this class were manual wheelchairs and hand-held walking AP (5 programmes each). These devices are also included on the GATE APL. Pressure relief cushions and posture support devices, products that are often essential with a wheelchair, and part of the GATE APL, were included in one and no programmes respectively.

Limb and spinal orthoses were taught by four programmes, two of which specifically mentioned ankle foot orthoses. Limb prostheses were covered by one programme and only included lower limb prostheses. Similarly products for self-care, domestic life, alarming, indicating, reminding and signalling as well as for controlling, adapting or measuring elements of physical environments was mainly covered by one programme. However, many products in these ISO classes were not included.

Policy and guideline documents were included in the teaching of manual wheelchairs, albeit by only three of the five programmes.

All four service steps (assessment, procurement/fabrication and fitting, user training, maintenance and repair) were covered for six products and not by all programmes teaching these products. Teaching and student assessment were often theoretical in nature. Clinical exposure was not always required and in many instances indicated as incidental. Covering of products were discipline specific except for one programme that provided a broad overview and covered 88 products in total.

Regarding the expected level of learning according to Blooms taxonomy most products were taught to a level 3 (Understanding – Explaining ideas or concepts, interpreting, summarising, paraphrasing, classifying, explaining) or 4 (Applying – Using information in another familiar situation, implementing) (Table 3). One programme required a level 1 (mentioned, but not expected to remember or know about) outcome for all eight products listed.

Discussion

A wide range of AP was covered. However the products covered were not in accordance with the GATE APL or any other apparent guideline/context. As a minimum, the APL should be covered by most programmes before being supplemented by other essential AP related to local context and healthcare burden [24]. Furthermore teaching on AP appeared limited to discipline specific areas, selective and seemingly random. This will negatively impact person-centred service delivery, resulting in a silo approach instead of a broad understanding of the range of products needed [16].

In South Africa where graduate health care professionals are in short supply innovative practices are needed in AT services especially in rural areas. This includes task-shifting and training of other categories of service providers to provide AT or to identify AP needs and refer users for AT [16]. However, with the limited AP knowledge, exposure and training in the programmes graduates will be unable to provide AP across traditional professional boundaries, train and mentor other categories of service providers in AP provision or to act as resources.

Only handheld mobility assistive products and wheelchairs were well covered. Studies from the Western Cape have also shown that participants mobility needs were often met [25,26], and wheelchair provision is not as lacking in South African settings as in other African countries [20]. However, teaching on tri-cycles, a GATE APL product, was not included in any of the programmes. Tricycles are an important means of mobility for children and adults with impairment of the lower limbs [27].

The wide inclusion and strong emphasis on wheelchairs might be due to a strong focus on wheelchair provision in the Western Cape Province supported by a provincial mobility assistive devices advisory committee in the nineties and early 2000s. This committee advocated for an appropriate range of wheelchairs on national tender, managed wheelchair waitlists in the province and initiated wheelchair service delivery training programmes. Wheelchair service training programmes continue to be offered annually to equip therapy graduates with the necessary skills and knowledge to provide wheelchair services [28–30]. These programmes are in line with both the WHO guidelines on wheelchair provision in less resourced settings [31] and the WHO wheelchair service training packages [32,33].

However, a related and worrying finding is the lack of teaching on pressure relief and posture support products. Providing a wheelchair without adequate posture support and pressure relief might lead to secondary complications such as pressure ulcers [34] and scoliosis [35]. User functioning might also be

Table 3. A summary of the assistive products included in the eight programmes and the teaching provided on each.

ISO Class and subclass	Product	Professions	Nr of Programs	Assess user	Provision	User training	Maintain & repair	Blooms Level	Clinical Exposure	Student assessed
<i>04 Assistive products for measuring, supporting, training or replacing body functions</i>										
(04 33) Assistive products intended to manage tissue integrity	Pressure relief cushion & mattress	OT	1	No	No	No	No	3	Yes	Theory
(04 48) Equipment for movement, strength and balance training	Weighted cuffs	OT	1	No	No	No	No	3	Yes	Theory
(04 24) Physical, physiological and biochemical test equipment and materials	Scale	HM	1	No	No	No	No	3	Yes	No
<i>(06) AP attached to the body for supporting movement related functions (orthoses) and replacing anatomical structures (prostheses)</i>										
(06 24) Lower limb prostheses	Lower limb prostheses	PT	1	Yes	No	Yes	No	3	Incidental	No
Orthoses	Lower limb, upper limb and spinal orthosis, Plaster of Paris back slabs	PT OT	4	3-Yes 1 - No	3-Yes 1 - No	3-Yes 1 - No	1-Yes 3 - No	1,3,3,5	2-incidental 2 - No	3-Yes 1 - No
<i>09 Assistive products for self-care activities and participation in self-care</i>										
(09 33) Assistive products for washing, bathing and showering	Shower/ bath chairs boards/ seats, hand held shower, Wash mitt, soap on a rope, non-slip mats	OT	2	No	No	No	No	1 & 4	1 yes 1 no	1 theory 1 No
(09 12) Assistive products for toileting	Toilet seat raise/ commode	OT	1	No	No	No	No	4	Yes	Theory
(09 09) Assistive products for dressing and undressing	Dressing stick, Sock aid, Velcro, zipper puller	OT	1	No	No	No	No	4	Yes	Theory
<i>(12) AP related to personal mobility and transportation</i>										
(12 03 & 12 06) Assistive products for walking, manipulated by one or two arms	Canes, sticks, elbow crutches, walking frame	3 PT 2 OT	5	4 Yes 1 No	4 Yes 1 No	4 Yes 1 No	3 Yes 2 No	1,4,4,5,6	4 Yes 1 Incidental	4 Yes 1 No
(12 31) Assistive products for changing body position	Transfer boards	OT	1	No	No	No	No	4	Yes	Theory
(12 36) Assistive products for lifting	Hoists	OT PT	2	No	No	No	No	1,3	Incidental	Theory No
(12 39) Assistive products for orientation	White cane	OT	1	No	No	No	No	3	Incidental	Theory
(12 22) Manual wheelchairs	Manual wheelchairs	PT OT	5	Yes	Yes	Yes	1 Yes 4 no	1,3,4,4,4,4	4 Yes 1 Incidental	4 Yes 1 No
(12 23) Powered wheelchairs	Posture support wheelchairs / Buggies Powered wheelchairs	OT PT	1 2	No 1 Yes 1 No	No 1 Yes 1 No	No 1 Yes 1 No	No No No	2 2,2	Yes 1 Yes 1 No	No No No
<i>(15) AP for activities and participation in domestic life</i>										
(15 03) Assistive products for preparing food and drink	Rocker knife	OT	1	Yes	Yes	Yes	Yes	4	Yes	Theory
(15 09) Assistive products for eating and drinking	Feeding pump, Plate guards and stabilisers, weighted utensils, universal cuff, straws, built up handles	HN OT	2	Yes	Yes	Yes	Yes	3	Yes	Yes
<i>(18) Furnishings, fixtures and other AP for supporting activities in indoor and outdoor human-made environments</i>										
	Hand and grab rails & bars		2	Yes	Yes	Yes	No	3		(continued)

Table 3. Continued.

ISO Class and subclass	Product	Professions	Nr of Programs	Assess user	Provision	User training	Maintain & repair	Blooms Level	Clinical Exposure	Student assessed
(18 18) Supporting handrails and grab bars		OT							1 Yes	1 Theory
(18 30) Assistive products for vertical accessibility	Stair lifts, ramps	PT	1	No	No	No	No	3	1 Incidental	1 No
(18 24) Construction elements in homes and other premises	Tap turner, door handles, step ladder,	OT	2	No	No	No	No	1,3	Yes	Theory
(22) AP for communication and information management										
(22 03) Assistive products for seeing	Spectacles, magnifiers	OT	1	No	No	No	No	3	Yes	Theory
(22 06) Assistive products for hearing	Hearing aid	SL	3	2 Yes 1 No	2 Yes 1 No	2 Yes 1 No	2 Yes 1 No	3,4,6 4	3 Yes	2 yes 1 theory
	Frequency modulating system, Cochlear implant	SL	2	No	No	No	No	2,4	No	No
(22 15) Assistive products for calculation	Talking calculators	OT	1	No	No	No	No	3	Yes	Theory
(22 18) Assistive products that record, play and display audio and visual information	Video communication device, recorders, text to text devices	OT	1	No	No	No	No	3	Yes	Theory
(22 21) Assistive products for face-to-face communication	Communication board, Hitech dedicated devices, Hi tech non dedicated devices	SLH OT	2	Yes	Yes	Yes	Yes	3,7	Yes	Yes
(22 24) Assistive products for telephoning and telematic messaging	Phone amplifiers, simplified mobile phone	OT	1	No	No	No	No	3	Yes	Theory
(22 27) Assistive products for alarming, indicating, reminding and signalling	Doorbell indicators, Fire alarms, Vibrating multi-sound wrist bracelets, Watch with pre-programmed task reminders, pill organisers, visual timers, time orientation products, portable GPS trackers, fall detectors, wireless alarm, personal; alarm, medical alert ID, personal digital assistant	OT	1	No	No	No	No	3	Yes	Theory
(22 30) Assistive products for reading	Braille, text to speech, Deaf/blind communicator, automatic speech recognition in captioning systems	OT	1	No	No	No	No	3	Yes	Theory
(22 36) Input devices for computers	Braille keyboard, Word completion programmes	OT	1	No	No	No	No	3	Yes	Theory
(22 39) Output devices for computers	Screen readers	OT	1	No	No	No	No	3	Yes	Theory
(24) AP for controlling, carrying, moving and handling objects	Easy grip handle, gripping tongs, rollator with basket, carrier bag	OT	1	No	No	No	No	1,3	Yes	Theory
(27) AP for controlling, adapting or measuring elements of physical environments										
(27 03) Assistive products for environmental improvement	Environmental control unit	OT	1	No	No	No	No	3	Yes	Theory

Table 4. Presentation of products on the GATE List of 50 included in the programmes.

Gate no.	Product	No of prog	Gate no.	Product	No. of prog	Gate no.	Product	No of prog
1	Alarm signallers	1	18	FM systems	2	25	Screen readers	1
2	DAISY audioplayers	0	19	Incontinence products	0	36	Simplified mobile phones	1
3	Braille (displays)	1	20	Keyboard and mouse emulation software	0	37	Spectacles	1
4	Brailers (writing)	1	21	Magnifiers (digital)	1	38	Standing frames	0
5	Canes	4	22	Magnifiers (optical)	1	39	Therapeutic footwear	0
6	Shower/bath chairs	2	23	Lower limb orthoses	3	40	Time management products	1
7	Closed captioning displays	0	24	Spinal orthoses	3	41	Travel aids	1
8	Club foot braces	0	25	Upper limb orthoses	3	42	Tricycles	0
9	Communication boards	2	26	Personal digital assistant	0	43	Video communication devices	1
10	Communication software	1	27	Personal emergency alarm systems	1	44	Walking frames	4
11	Crutches	4	28	Pill organiser	1	45	Talking watches	0
12	Deafblind communicators	0	29	Pressure relief cushion	1	46	Active manual wheelchairs	5
13	Fall detectors	1	30	Pressure relief mattress	1	47	Assistant controlled manual wheelchairs	5
14	Gesture to voice	0	31	Lower limb prostheses	1	48	Wheelchairs with postural support	1
15	GPS locators	1	32	Portable ramps	1	49	Motorised wheelchairs	2
16	Grab rails	2	33	Recorders	1	50	White canes	1
17	Hearing aids	3	34	Rollators	4			

compromised as oro-facial function, hand function and respiration is facilitated by an optimal, safe seating posture [36].

While orthotic products were covered by more programmes than most other products, two products in this category listed by GATE i.e., clubfoot braces and therapeutic footwear were not included by any programme. A clubfoot brace is an essential component of managing club feet, and if not provided can lead to a relapse in approximately 78% of children with clubfeet [37]. Similarly therapeutic footwear is effective in the prevention and management of diabetic foot ulcers [38]. Inclusion of both these products in undergraduate teaching on assistive products is recommended.

Hearing aids were covered by all speech, language and hearing programmes that participated in the study. Hearing aids fall under the ISO category of AP for communication and information management. This is a very broad category and the findings showed that few of the numerous products in this class were included in the programmes under study. The majority (7/12) of the 12 products listed by GATE which were not included in any of the programmes resides in this category. As communication is such a pivotal component of human functioning [39] more attention to AP in this category is important.

There was poor inclusion of AP for self-care, participation in domestic life, furnishings, fixtures and other AP for supporting activities in indoor and outdoor human-made environments. Previous research from Africa [20,24] and the Western Cape has found that AP for participation in domestic life and self-care was provided much less frequently than mobility AP [25,26]. Scheffler and Mash [26] further showed that 3.8% of products needed for eating were supplied to stroke survivors and none of the washing/bathing devices needed were supplied through services. On the other hand 64% of walking devices needed and 91% of the wheelchairs needed were supplied.

Not one of the programmes included incontinence products. However, research has shown it to be a major need of persons without bladder and bowel control and their caregivers [26,40]. Scheffler and Mash [26] further showed that of the 112 incontinence products needed only 23% were provided by services. The rest were sourced and funded by users themselves, because they

could not do without it and were not supported to access it through services. However, paying for incontinence products add to financial strain on families [40].

None of the ISO classes focussing on community integration and participation were included in any of the curricula. It seems as if programmes mainly prepare students to assist clients with products that will enhance generic activities. However, AP should enhance participation along with activities. Such limited AP services provision might be due to the silo approach [16] alluded to earlier in this article, as well as service limitations. While a direct link cannot be made between lack of training and lack of service provision it will be difficult for service providers to provide a specific product or advocate for the inclusion in services if they have not been trained on it.

In Africa potential users are not always aware of AP and the functional benefits they offer. Service providers should thus play a teaching role in communities to raise awareness on AP. If service providers are uninformed they will not be able to inform users of what they need hence affecting the ability for users to become informed and empowered and eventually influencing demand.

Despite the availability of both national [41] and international AP provision guidelines, except for wheelchairs, teaching on AP was not underscored by these documents. International guidelines and standard setting documents on AP provision include The WHO guidelines on wheelchair provision in less resourced settings [31], community-based rehabilitation guidelines [42], the Joint Position Paper on the Provision of Mobility Devices in Less Resourced Settings [43], Standards for prosthetics and orthotics (Part 1 and 2) [44,45] and Rehabilitation in health systems [46]. Using these guidelines in teaching AP service delivery should assist with the provision of a comprehensive user centred service and prevent omission of some of the service steps during teaching.

Professional healthcare graduates should have the knowledge in all four service steps to deliver comprehensive services: assess for and provide users with appropriate assistive products as well as train users in product use and maintenance. A lack of sufficient knowledge might lead to a lack of self-efficacy amongst service providers that can negatively impact provision of AP [47]. To do

this the educational goal should be at least a revised Bloom's level 4 (Table 1). This level of proficiency was not required for many products listed by participants (Table 2). There is also some discrepancy between the required level of proficiency, clinical exposure needed and student assessment on the product. In order to be sure that students achieve a level 4 they should be formally assessed and should be exposed to the product during clinical placement.

Furthermore, where level 4 proficiency is expected all of the service delivery steps should be included in the teaching. This was not the case for most products. Without teaching on assessment, procurement/fabrication and fitting, user training, maintenance and repair it will be difficult for the students to apply the knowledge they have gained in clinical situations and provide a user centred service. No product should be issued without the user being trained, as training ensures safe, competent use of the product [17,48]. Similarly users should be educated in maintenance and repairs. Even if clinicians will not provide maintenance or repair services, they must be knowledgeable on maintenance and repair requirements as they will be the ones teaching the users these skills.

Conclusion

Whilst AP was included in all the participating undergraduate programmes the range of included products and the level of training was insufficient to prepare graduates to effectively address user's needs and assist them with choices on AP. Newly appointed graduates will require early in-service training to ensure appropriate AP service delivery. Another concern is that the GATE APL was not fully represented in training.

Recommendations

To ensure appropriate trained service providers, undergraduate training programmes should align curricula with essential AP in addition to the GATE APL and ensure that teaching on those products includes all service steps, practical experience and examination. Post graduate diplomas on key AP is recommended to build capacity of existing service providers. The programme should include theoretical and practical components.

Geolocation information

This study was performed in the Western Cape Province of South Africa, Africa.

Disclosure statement

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