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Attitudes towards people with disabilities: a systematic review of intervention effectiveness

Yuleinys A. Castillo[1*)], Alan Larson[2]
[1]California State University, Fresno, USA
[2]Stephen F. Austin State University, USA
*)Corresponding author, e-mail: yuchas@aim.com

Abstract

The improvement of attitudes towards people with disabilities has led to studies focusing on the impact of interventions. This review systematically analyzes and synthesizes the use of interventions to influence attitudes toward people with disabilities. A comprehensive search was conducted across multiple databases to identify studies that used an intervention in English with a defined assessment instrument meant to measure attitudinal changes toward people with disabilities. Based on a literature research, 32 studies conducted in fourteen different countries were included. In the majority of the cases, the use of interventions was an effective tool to improve attitudes towards disabilities. Implications of findings for practitioners and researchers are discussed.

Keywords: Rehabilitation counseling, interventions, attitudes, disability, stigma, society.

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Introduction

People with disabilities often experience negative attitudes and discriminatory actions in society (Smart, 2009). Being a target of negative attitudes and behaviors can lead to feelings of loneliness, anxiety, and low self-worth (Marini & Stebnicki, 2017). Additionally, prejudice, attitudinal barriers, and discrimination can limit the opportunities of people with disabilities in multiple areas including education (Rao, 2004), employment (Gilbride, Stensrud, Ehlers, Evans, & Peterson, 2000; Taylor, Krane, & Orkis, 2010), community integration (Verdonschot, de Witte, Reichrath, Buntinx, & Curfs, 2009) and access to services (Krahn, Walker, & Correa de Araujo, 2015). Therefore, rehabilitation professionals can assess negative attitudes and their impact on the experiences and integration of people with disabilities.

Negative perceptions toward disabilities, in general, can affect behaviors and attitudes towards people with disabilities at social and individual levels. Societal perceptions of disabilities can also lead to stigma that can affect equality and inclusion (Green, Davis, Karshmer, Marsh, & Straight, 2005). Moreover, the societal stigmatization of disabilities can create substantial disparities in health, housing, employment, limited community life, and increased social distance (Werner, Corrigan, Ditchman, & Sokol, 2012). Exposure to society's disability stigma can also result in self-stigma when a person with a disability internalizes a sense of prejudice and discrimination (Corrigan & Kosyluk, 2014). As a result of self-stigma, people with disabilities may experience reduced self-esteem, empowerment, and hope, as well as show reluctance to participate in treatment, employment, and services (Livingston & Boyd, 2010). Consequently, disability stigma can result in social disadvantages rooted in society as well as in the individual.

These social and individual drawbacks, as a result of stigma, can vary for a variety of factors. The level of stigma varies depending on types of impairment, reason of disability onset, and severity of the condition. In a previous study, perceptions of parents and teachers on raising a child with disability, considering stigma and marginality, described two views of disability (Lalvani, 2015). Parents, using a social model, recognized cultural meanings ascribed to disability related to stigma, marginalization and access while teachers utilized a medical model to biologically define the experience of children with disability. In addition to perspective on disability from different models, stigma is on a spectrum that fluctuates depending on type of impairment. For instance, people with intellectual disabilities and mental illness tend to experience the most social inequalities and disparities in basic human rights due to stigma (Ditchman, Werner, Kosyluk, Corrigan, 2013). People with intellectual disabilities, severe mental health conditions, sensory disabilities, and albinism tend to experience more stigma than people with physical disabilities (Rohwerder, 2018).

In order to reduce the undesirable impact of negative attitudes on the quality of life of people with disabilities, a variety of social interventions have been implemented and tested to increase education and improve attitudes. For instance, educational projects that enhanced knowledge about disabilities (Kim, Park & Snell, 2005; Tavares, 2011) as well as previous exposure to disability related information (Vignes el al., 2009) had been found to have a positive effect on students' attitudes regarding disabilities. Generally, education and contact interventions have been found to be the most effective approaches to change attitudes toward disabilities (Corrigan, Morris, Michaels, Rafacz, & Rusch, 2012). Similarly, interventions used in different settings have been effective to diminish the impact of stigma on the perception of disabilities in society (Dunn, 2015).

Interventions influence on changing attitudes

People with disability face significant social challenges impacting their full participation and inclusion in society. Ableism relations, which are based on an ideal of normal and a division between "normal" human and subhuman, result in marginality and a perception of disability as problematic to community systems (Campbell, 2012). These negative interpretations of disability represent a complex barrier that creates oppression for people with disability resulting in ableism (Brown & Broido, 2014). Moreover, ableist attitudes are multipart and may sometimes change slowly with a type of intervention.

Attitudes are considered to have three components, affect, cognition, and behavior, which may function as antecedents and consequences of attitudes (Olson, 1993). In other words, the three components can form attitudes but attitudes can also impact affect, cognitions, and behaviors. Additionally, attitudes impact the framework use to interpret environments and interactions with people with disabilities with a structured set of cognitions, relationships among those cognitions, and specific examples based on previous experiences (Fichten, 1994). Hence, attitudes can play a role in evaluating, interacting, and supporting people with disabilities.

Since changing attitudes can influence future behaviors, interventions represent an opportunity to increase positive attitudes towards people with disabilities. Attitudes can predict one's future behavior after a direct experience and information about the attitude object (Azjen, 2005). Disabilities become an attitude object that can influence one's behaviors and decisions. When individuals have negative attitudes towards disabilities, people with disabilities have limited opportunities of acceptance and educational engagement (Moore & Nettelbeck, 2013). However, different interventions strategies have positively influence attitudes towards individuals with disabilities (Rabenschlag et al., 2012; Swaim & Morgan, 2001) representing mechanism to foster accepting behaviors. Because of the predicting ability of behaviors, interventions focus on changing attitudes can change interactions and inclusion for people with disability.

Attitudinal interventions targeting disabilities have been utilized for many years to boost the quality of life of people with disabilities. In a systematic review, direct contact and indirect contact with people with disabilities were found as effective mechanisms to improve children's attitudes towards disability (MacMillan, Tarrant, Abraham, & Morris, 2014). Similarly, education based interventions have also positive effects on attitudes towards disabilities using brief educational media (e.g. Lindau, Amin, Zambon, & Scior, 2018), three weeks education projects (e.g. de Boer, Pijil, Minnaert, & Post, 2014), and combined methods (e.g. Reina, Lopez, Jimenez, Garcia-Calvo, & Hutzler, 2011). Equally, creative teaching interventions in a meta-analysis, as puppet shows, have led to changes in individuals' attitudes and knowledge of individual with disabilities (Dunst, 2014).

| DOI: 10.23916/0020200526120

Since interventions can help reduce the influence of stigma on the lives of people with disabilities, a systematic review of methods utilized to improve attitudes can assess effectiveness and provide potential options. Despite the research on interventions to improve attitudes toward disability has focused on strategies, the common elements of effective components can be synthesized. The aim of this review was to systematically review and synthesize the use of attitudinal interventions and how attitudes were changed toward people with disabilities using different strategies. This review intends to assist rehabilitation services professionals in identifying and understanding the implications of interventions in the inclusion and participation of people with disabilities. Understanding the significance of interventions is beneficial to intentionally incorporate strategies in services and social environments as well as increase disability intervention awareness. At the time of this study, other systematic reviews focused exclusively on children or focused on different parts of attitude changes; thus, this review specifically explored the utilization and success of different interventions to enhance attitudes toward disabilities.

Method

The approach used for this systematic review was an adapted version of a suggestion by Bettany-Slatnikov (2010a, 2010b), who recommends starting with an overall research question and then investigating populations, interventions, comparison of interventions, and outcomes. In this study, the overall research question is "how effective are interventions on changing attitudes toward people with disabilities?" The following supplemental research questions were also considered:

RQ1: Whose attitudes were attempted to be changed, and toward what types of disabilities?
RQ2: What interventions were used in attempting to change attitudes?
RQ3: What were the results of the interventions?

Criteria for inclusion

Studies included in this review evaluated interventions to change attitudes toward disabilities. For the purpose of this analysis, dissertations, literature reviews, conference papers, and book reviews were not included. Even though different interventions could help to improve attitudes, the focus was to evaluate studies performed using the English language with a clear measurement directed toward any type of disability. For consideration in this analysis, empirical studies published in peer-reviewed journals also had to involve participants in an intervention, measure attitudes toward disability, and take place in a community or educational setting.

Identification process

A systematic search was conducted using online library databases and the search engines of Academic Search complete, Psychology and Behavioral Sciences Collection, PsychINFO and PscyhARTICLES to find relevant peer-reviewed academic journal articles using the general search terms: attitude change, intervention, and disabilities. The systematic review of intervention studies focused on research published between 2005 and *2016*. After eliminating any irrelevant or duplicate results, a total of 379 unique articles were generated. These peer-reviewed articles were then revised for the following inclusion criteria: 1) included an attitude change intervention, 2) able-bodied participants were the participants in the intervention, 3) the utilization of a qualitative and/or quantitative type of disability attitudes measurement 4) the study took place in a community or educational setting, and 5) written in English. Articles were excluded if they were about the psychometric properties of an instrument, were a meta-analysis, did not deal with specific attitudes about people with disabilities (i.e., attitudes about sex, diversity, inclusion, etc.), took place in a medical setting, or were about another unrelated topic. The end result was the total of 35 articles used in this analysis.

Results

Overview of studies

The full data set containing the results from all 35 studies can be found in table 1. The studies identified in this analysis took place all over the world. The sample sizes ranged from 2 to 873, and the age of the participants started from 7-years old into late adulthood. Specific answers to the research questions will be discussed in the next sections.

Intervention population samples and disability types

Indonesian Counselor Association (IKI) | DOI: 10.23916/0020200526120

To answer the question of whose attitudes were attempted to be changed, we first categorized the studies by country. The United States had the most studies conducted in it, with 11 (31.43%) while twelve (34.29%) of the remaining studies were conducted in various countries in Europe, five (14.29%) were conducted in the Middle East, three (8.57%) were conducted in Canada, and two (5.71%) were conducted in Africa, and remaining two (5.71%) were conducted in India, and Australia.

Subsequently, we also divided the groups within the studies based on whose attitude was attempted to be changed. Overall, there were 41 different groups tested but some studies intervened with more than one type of group, thus there are more groups than studies. The most frequent intervention group was college students, with 20 (48.78%). Eight (19.51%) of the remaining groups were students in school, four (9.76%) were various types of professionals already working with people with disabilities, another four (9.76%) with the general public two (4.88%) were with teachers, and three others (7.32%) were mothers of children with intellectual disabilities, theme park employees, and wheelchair users due to a spinal cord injury.

To answer the question what disabilities were the object of attitude change, we grouped the specific disabilities listed in the studies into six broad disability categories. Because some studies measured the attitudes toward multiple types of disabilities, there were a total of 48 disabilities noted in the studies. The most frequently studied disability attitude was intellectual disabilities that included learning disabilities, with 15 (31.25%), nine (18.75%) were the disability population as a whole, eleven (22.92%) were physical disabilities such as spinal cord injury, cerebral palsy, spina bifida, and muscular dystrophy, six (12.5%) were on sensory disabilities such as vision and hearing impairments, another five (10.42%) were mental disability such as mental illness and autism, and the remaining two (4.17%) were Tourette's syndrome and communication disorders. The specific context of the results regarding used interventions for attitudinal change toward disabilities will be discussed in the next section.

Interventions for attitudinal change

To answer the question of what types of interventions were used to change attitudes, we organized the data first by category and then by study. We grouped the interventions into categories based on type of interventions. The interventions varied from formal education, contact, simulations, combined instruction, and community based approaches.

Type of interventions.

We next looked at the intervention data across studies. Of the 35 studies, 13 (37.14%) combined instruction, which included any planned combination of formal instruction with contact or simulation, nine (25.71%) used only formal education, seven (20%) used only contact, two (5.71%) focused on simulations, and one study each used teacher support, marketing, counseling, or a film festival (11.43%). Each group of interventions aimed to change attitudes toward disabilities.

Combined instruction.

Thirteen studies combined formal instruction and a behavioral component. These studies aimed to blend a cognitive intervention, which prepare participants by learning about medical conditions and personal experiences prior to engaging in a behavioral activity (contact or simulation).

For instance, teachers in Cairo participated in 12 sessions (60 minutes each), combined with working and providing training to people with intellectual disabilities in sheltered workshops (Hassanein, 2015). In another study, medical students, in London, participated in a 14-week neurosciences course which included a three hour lecture on intellectual disabilities and an opportunity to participate in a three-week placement at two learning disabilities services (Sinai et al., 2013).

Using contact theory as a theoretical framework, Wozencroft, Pate and Griffiths (2015) examined the impact of a service learning class on college students' attitudes toward people with disabilities. As part of this class, students received lecture material and worked directly with people with disabilities in a week long therapeutic camp environment. In another study involving graduate and undergraduate students, a course curriculum along online learning component, lectures, team based problem solving, and client interviews, were used to change knowledge, skills, and attitudes toward individuals with intellectual disabilities (ID) among healthcare students in Canada (Jones et al., 2015). To close the training, students participated in an interactive learning group to formulate a comprehensive assessment and treatment plan from the clinical vignettes.

| DOI: 10.23916/0020200526120

Five studies involved undergraduate students in different universities across the world. In a study in Ireland, undergraduate dental students enrolled in a comprehensive, blended learning program involving lectures, experiential workshops (i.e. observing dental procedures), and access to informational resources (Phadraig et al., 2015). In another study, undergraduate students received several preparatory lectures and seminars before interacting two to three times with a person with mild to moderate learning disabilities in a local day center or social enterprise unit (Smith & Forrester-Jones, 2014). Fourth year undergraduate medical students participated in a three hour communication skills training session to improve interactions and reduce communication issues with patients with intellectual disabilities (Tracy & Iacono, 2008). Finally, Israeli undergraduate social work students participated in a service learning program called Ripple Effect that included weekly interactions with people with disabilities (Zychlinski et al., 2016).

To change negative attitudes toward people with physical disability, ninth grade students in Germany participated in a cognitive intervention, which provided information and stereotypes about physical disability, and a behavioral intervention of engaging in three Paralympic disciplines under the instruction of athletes with disabilities (Krahe & Altwasser, 2006). In Israel, middle school students without disabilities, who attended general education schools, participated in an inclusion program requiring 30-90 minute weekly or bi-weekly activities with students in special education classes (Marom et al., 2007). Students without disabilities received information about the specific disabilities prior interacting with students with disabilities in joint activities such as, sports, music, arts, volunteering, and social games. In another Israeli study, 9th grade students from various junior high schools participated in a school year long leadership integration program which combined information about disabilities with opportunities for contact with individuals with disabilities (Cohen et al., 2012). After four months in the program, the 9th grade students held workshops about prejudice, stigma, equal opportunities, and experiences with disabilities for the 8th grade students.

One study combined an educational component with a behavioral activity using simulation. Lewis (2011) used lecture-based awareness training and active impairment simulation activities to evaluate their influence on the attitudes of urban planning students in a Canadian university. The training event consisted of three lectures followed by a simulation exercise where the students wore prosthetic devices (e.g. leg braces), used mobility equipment (e.g. wheelchairs, crutches), or wore goggles. The lectures addressed general topics related to disability and impairment, and accessible planning and design. Another study used six digital brief interventions consisting of different combinations of education, indirect and imagine contact (Lindau, Amin, Zambon, & Scior, 2017).

Formal instruction

Nine studies used a form of training to improve participants' attitudes toward disabilities. Two studies offered a workshop lasting from 90 minutes to one day. Tourism students in Slovenia participated in a 90 minute training covering material about social and psychological dimensions of disabilities as well as financial opportunities for businesses to generate profit in the growing market of customizing tourism for people with disabilities (Bizjak et al., 2011). In another study, a one-day disability awareness workshop was used to improve knowledge and attitudes toward guests with disabilities in theme parks (Hall, 2008). The workshop offered two sessions: one covering general issues about disability followed by a second session about specific disability areas, including origin of attitudes, strategies, double disability, among others.

As opposed to offering brief interventions, two studies opted for long educational engagements in academic settings. In Jordan, nursing students attended a course on mental health and pathology to improve attitudes toward people with mental illness (Hamaideh & Mudallal, 2009). Finally, rehabilitation students, with different professional backgrounds and nationalities, completed a semester long program with seminars and lectures to establish a positive attitude toward disability and working with people with disability (Yazdani et al., 2016).

Another type of formal instruction used in five studies was the use of short videos about people with disabilities. In Ireland, school aged children were exposed to audiovisual material promoting inclusion for children with Down syndrome (Gannon & McGilloway, 2009) while in the UK students watched a video on Paralympic athletes (Ferrara et al., 2015). Also in the UK, college students watched either a video of a rock band that included people with and without disabilities or a video about a hate crime committed against a person with an intellectual disability (Walker & Scior, 2013). The other two studies were carried out in the United States. Flatt-Flutz and Phillips (2012) utilized a training video on empowerment of

Indonesian Counselor Association (IKI) | DOI: 10.23916/0020200526120

individual with intellectual and developmental disability for direct support professionals in human services. Lastly, Holtz and Tessman (2007) used short videos to increase elementary children's knowledge and improve attitude toward a peer with Tourette syndrome.

Contact

Seven studies used direct or indirect contact between participants and people with disabilities as an intervention to positively influence attitudes toward disabilities. In order to create an intervention that included equal-status contact and pursuit of common goals, Sullivan and Glidden (2014) required college swim team members to work together with Special Olympics swimmers to pursue swimming-related goals in 4 sessions over a 6-week period. In Canada, volunteering for 4 to 10 months with children with physical or hearing impairments was used to decrease social distance and improve attitudes (Fichten et al., 2005).

In another study, personal narratives, which can teach and influence emotions, written by individuals with complex communication needs, were used to change the attitudes of undergraduate business majors (McCarthy et al., 2010). Similarly, Galli et al. (2015) explored the influence of direct and indirect contact on attitudes toward wheelchair users. Participants were asked to interact with an individual with spinal cord injury in a 45-minute semi-structured conversation or to listen to a 45-minute audio about the experiences of wheelchair users. Equally, community based groups listened to adults with disabilities sharing their personal narratives (Gona, Newton, Hartley, & Bunning, 2018).

Finally, a study in the United States used person-centered videos describing the life experiences of people with visible disabilities (Lu, Webber, Romero, & Chirino, 2018). Staff, who provided services for adults with intellectual disabilities, participated in a half day training delivered by a trained professional and a person with an intellectual disability (ID) (Hutchinson et al., 2014). The Who's Challenging Who program incorporated two levels of contact with people with behavior challenges: direct contact with trainer with ID (valued position) and workshop material focused on people with ID and/or autism.

Simulation

Having participants act out being disabled for a period of time is considered simulation. In order to foster the development of positive attitudes toward persons with physical disability, Amosun, Wolmink and Rosin (2005) followed two South African students who registered in a 4-week special training module as part of their medical training. A role-playing exercise was used as a single, active learning intervention requiring to assume a mobility limitation and use a wheelchair for five consecutive working days. Students also maintained a journal to capture their everyday reflections about their simulation experience. Undergraduate student in an American university participated in a three-phase mixed method design involving simulation activities during an abroad study experience (McKenney, 2018).

Sole interventions

Four studies involved provided an intervention that required participants to engage in a variety of activities or aimed to affect society at large. In a study, Teachers in Science, Technology, Engineering Math (STEM) classes participated in a program educating students with visual impairments to increase awareness and provide funding for supplemental adaptive resources (Rule et al., 2011). In another study, Kirkwood and Stamm (2006) guided the design, distribution, and evaluation of an anti-stigma campaign regarding people with mental illness. A film festival was designed to provide authentic representation of people with disabilities living normal lives to help viewers see individuals with disabilities as people first (Schwartz et al., 2010). Lastly, counseling sessions were used to change attitudes of mothers of children with disabilities (Saravanan & Rangaswamy, 2012). Next, outcomes of the interventions will be discussed.

Intervention outcomes

Some studies aimed to evaluate the utilization of interactive instruction type of interventions to improve attitudes toward people with disabilities. Wozencroft, Pate and Griffiths (2015) reported that students' attitudes positively changed after taking a course and remained constant after interacting with someone with a disability. The attitudes of students from different majors also positively changed when using interaction and education (Bizjak et ap., 2010; Lewis, 2011; McCarthy et al., 2010; Smith & Forrester-Jones, 2014; Sullivan & Glidden, 2014; Yazdani et al., 2016).

Five studies tried to evaluate the outcomes of work training interventions that positively influenced attitudes (Flatt-Fultz & Phillips, 2012; Hall, 2008; Hutchinson et al., 2014; Hassanein, 2015; Rule et al., 2011). Communication training, simulation activities, and participation in a course helped improve attitudes toward disabilities among future medical professionals (Amosun et al., 2005; Hamaideh &

| DOI: 10.23916/0020200526120

Mudallal, 2009; Jones et al., 2015; Tracy & Iacono, 2008). Furthermore, a brief film-based digital intervention, showed to community based participants, had a small positive effects on attitudes to people with disabilities improved (Lindau et al., 2017). Likewise, videos with real-life experiences of people with visible disabilities positively influenced attitudes of undergraduate students (Lu et al., 2018).

In a couple of studies, involving adults (Fichten et al., 2005), volunteer contact as well as direct interaction with a wheelchair user, were effective in enhancing attitudes (Galli et al., 2015). Similarly, direct contact between middle school Israeli students without disabilities with those with disabilities helped to changed stereotypes (Cohen et al., 2012; Marom et al., 2007) as well as personal narratives improved recognition of the person and generated ideas for collective action in favor of disabilities (Gona et al., 2018). In another study, 9th grade students' attitudes positively changed as a result of leadership inclusion training and personal contact with people with disabilities (Cohen et al., 2012). Additionally, the use of visual media also led to positive changes among children and adults in small and large audiences (Holtz & Tessman, 2007; Kirkwood & Stamm, 2006; Schwartz et al., 2010).

In this review, four studies were identified as reporting no effect on attitudinal changes after implementing an intervention method with participants. In a study on school aged children, Gannon and McGilloway reported that girls tended to hold more favorable attitudes than boys toward children with learning disabilities (2009). Compared to other studies, they found that having a friend or relative with Down syndrome or watching an informative video about children with Down syndrome made no differences in attitudes toward disabilities among participants. Moreover, Phadraig et al. (2015) reported that dental students reported no difference in attitudes toward disabilities before or after participating in a brief blended learning program involving lectures, experiential workshops and access to resources. Sinai, Strydom and Hassiotis (2013) also reported that medical students had a better understanding of the definition of intellectual disability but there was no significant change in attitude after enrolling in the neurosciences course. Finally, participation in a service learning program was unsuccessful to lead to significant changes in attitude (Zychlinski et al., 2016). However, volunteering was correlated with negative attitudes toward disability while positive attitudes were significantly associated with prior positive attitudes among Israeli students.

Table 1. Studies using interventions to change attitudes toward people with disabilities

Study	Intervention Group	Type of Intervention	Type of Disability	Results
Amosun, S. L., Volmink, L., & Rosin, R. (2005)	2 university medical students in South Africa (College)	Five days of disability simulation (Simulation)	Physical disability – wheelchair user(Physical)	The two students reported improved attitudes
Bizjak, B. Knezevic, M., & Cvetreznik, S. (2010)	124 tourism students in Slovenia (College)	Two disability education (Formal Instruction)	Disability in general (General)	Both forms of education led to improved attitudes
Cohen, R., Roth, D., York, A., & Neikrug, S. (2012)	164 9th grade students, leadership program in Israel (Pre-college)	Compared education and contact in a school year (Combined Instruction)	Intellectual disabilities(Intellectual)	Significant improvement in attitudes among students
Ferrara, K., Burns, J., & Mills, H. (2015)	114 college students in the UK (College)	Video of Paralympic and Olympic performances (Formal Instruction)	Intellectual disabilities (Intellectual)	Both groups had improved attitudes, and Paralympic media had the greater improvement
Fichten, C. S., Schipper, F., & Cutler, N. (2005)	71 new adult volunteers in Canada (Volunteers)	Working with children (4- to 10- month) (Contact)	Children with physical or hearing impairments (HI)(Physical, Sensory)	Attitudes toward both groups of children improved with better attitudes toward HI
Flatt-Fultz, E. & Phillips, L. (2012)	43 direct support professionals in the US (Professionals)	Empowerment video (Formal Instruction)	Intellectual and developmental disabilities (Intellectual, General)	More empowering attitudes after watching training video
Galli, G., Lenggenhager, B., Scivoletto, G., Molinar, M., & Pazzaglia, M. (2015).	85 wheelchairs users, physical therapists,people w/o disabilities in Italy (Professionals, Public, Other)	Interaction with wheelchair user and audio recording (Contact)	Wheelchairs use due to a spinal cord injury(Physical)	Having direct contact increased positive attitudes
Gannon, S. & McGilloway, S. (2009)	118 8-11 year old children in Ireland (Pre-college)	Lecture with supporting media (Formal Instruction)	Children with Down syndrome(Intellectual)	No significant improvement in attitudes

Indonesian Counselor Association (IKI) | DOI: 10.23916/0020200526120

Gona, J., Newton, C., Hartley, S., & Bunning, K. (2018).	249 community members Sub-Saharan Africa.	Personal narratives (Contact)	Diverse disabilities	Improved recognition of PWD as fellow human beings.
Hall, E.(2008)	40 theme park employees in the US (Other)	A 1-day disability awareness workshop (Formal Instruction)	Diverse type of disability. (General)	Disability awareness workshop enhance knowledge and positive attitudes toward guests with disabilities
Hamaideh, S. H. & Mudallal, R. (2009)	193 nursing students in Jordan (College)	Mental health & pathology course (Formal Instruction)	Mental illness(Mental)	Attitudes improved four of the five subscales
Hassanein, E. E. A. (2015)	18 teachers in Egypt (Teachers)	education and contact intervention (Combined Instruction)	Intellectual disabilities(Intellectual)	Participation in educational and contact intervention improved attitudes
Holtz, K. & Tessman, G. (2007)	179 elementary school children US (Pre-college)	Video-based intervention (Formal Instruction)	Tourette Syndrome(Other)	Video enhanced knowledge, positive attitudes, and behavioral intentions
Hutchinson, L. M., Hastings, R. P., Hunt, P. H., Bowler, C. L., Banks, M. E., & Totsika, V. (2012)	76 staff members at disability service related agencies in the UK (Professionals)	Trained by a person with an intellectual disability (Contact)	Intellectual disabilities and/or autism(Intellectual, Mental)	Significant improvement in 3 of the 4 subscales (empowerment, self-efficacy, and empathy)
Jones, J., McQueen, M., Lowe, S., Minnes, P., & Rishke, A. (2015)	247 graduate students in Canada (College)	Training curriculum and interview (Combined Instruction)	Iintellectual disabilities (Intellectual)	No significant change in attitudes
Kirkwood, A. & Stamm, B. H. (2006).	341 community caregivers, gatekeepers, and teens in the US (Professionals, public)	Anti-stigma social media marketing campaign (Other)	Mental illness and the general disability population(Mental, General)	One year follow-up showed changes in attitudes and/or behaviors

Krahe, B. & Altwasser, C. (2006)	70 9th grade students in Germany (Pre-college)	Training materials plus interaction (Combined Instruction)	Physical disabilities(Physical)	Only the cognitive-behavioral (contact) intervention produced signification positive results
Lewis, J. L. (2011).	200 students in Canada (College)	Education & simulation (Combined Instruction)	Pysical & visual (Physical, Sensory)	Interventions improved attitudes, educational intervention better
Lindau, N., Amin, T., Zambon, A., & Scior, K. (2017).	401 adults UK residents	Education with contact (Combined Instruction)	Intellectual Disability(ID)	Small positive effects on attitudes.
Lu, J., Webber, W., Romero, D., & Chirino, C. (2018)	53 US undergraduate students	Person-centered videos (contact)	Diverse disabilities	Improved explicit attitudes
Marom, M., Cohen, D., & Naon, D. (2007)	170 10 to 12-year old children in Israel (Pre-college)	Year-long information plus contact (Combined Instruction)	ID/Cerebral palsy(Intellectual, Physical)	Only the intervention group had improved attitudes
McCarthy, J., Donofrio-Horwitz, L., & Smucker, L. (2010).	109 business major students in the US (College)	Reading personal narratives (Contact)	Communication disorders(Other)	Reading narratives improved attitudes
Mckenney, A. (2018).	10 US participants (College)	(Simulation) activity	Physical & blindness(Physical/Sensory)	positively affect people's attitudes and levels of empathy
Phadraig, C. M. G., Nunn, J. H., Tornsey, O., & Timms, M. (2014)	109 undergraduate dental students in Ireland (College)	Education and experiential activities (Combined Instruction)	The general disability population(General)	No improvement in attitudes
Rule, A., Stefanich, G., Boody, R., & Peiffer, B. (2011)	15 science and mathematics teachers in the US (Teachers)	Teacher support: adaptive equipment and consultation (Other)	Visual impairments(Sensory)	Positive changes in attitudes among teachers in STEM classes.
Saravanan and Rangaswamy (2012).	32 mothers of children with disabilities in India	Psychological counseling (Other)	Intellectual Disabilities(Intellectual)	Mother's attitudes became more positive towards their children with

Indonesian Counselor Association (IKI) | DOI: 10.23916/0020200526120

	(Other)			intellectual disability
Schwartz et al., (2010)	107 graduate students, faculty, and community members in the US (College)	Film festival (Other)	Cerebral palsy, autism, Fragile X, Down syndrome & developmental disabilities(General)	Film can help to foster positive attitudes towards people with disabilities
Sinai, A., Strydom, A., & Hassiotis, A. (2013).	133 medical students in the UK (College)	14-week neurosciences course plus clinical placement (Combined Instruction)	Intellectual and learning disabilities (Intellectual)	Medical students increased knowledge of definitions and favorable attitude towards people with ID but there was no significant change in attitude
Smith, C. & Forrester-Jones, R. (2014).	62 undergraduate students learning disabilities in the UK (College)	Lectures plus two to three contacts (Combined Instruction)	Mild to moderate learning disabilities(Intellectual)	Change of attitude towards people with learning disabilities after experiencing direct contact
Sullivan, E., & Glidden, L. (2014).	33 college swim team members in the US (College)	Swim program with Special Olympic swimmers (Contact)	Intellectual and developmental disabilities(Intellectual)	Participation in program increased positive attitudes
Tracy, J., & Iacono, T. (2008).	128 undergraduate pre-medical students in Australia (College)	Contact plus education (Combined Instruction)	ID, with some physical and/or sensory disabilities(Intellectual, Physical, Sensory)	Significant positive change in attitude, better understanding and more comfortable feeling
Walker, J, & Scior, K. (2013).	403 College students in the UK (College)	10-minute film (Formal Instruction)	Intellectual disabilities(Intellectual)	Changed inclusion attitudes and social distance
Wozencroft, A., Pate, J., & Griffiths, H. (2015).	84 students in a service learning class in the US (College)	Contact plus education (Combined Instruction)	Diverse disability(Physical, Sensory, Mental)	Significant change in attitudes at the end of the course
Yazdani, N., Yazdani, F., & Nobakht, L. (2016)	14 students in a rehabilitation master's	Semester long lecture (Formal Instruction)	The general disability population (General)	Students became more accepting of people with disabilities

	program, UK (College)			
Zychlinski, E., Ben-Ezla, M., & Raz, Y. . (2016).	150 social work students in Israel (College)	Service learning course plus contact (Combined Instruction)	The general disability population (General)	No significant overall change in attitude.

Studies are alphabetically sorted - Category in parentheses

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Implications

This systemic review identified 35 articles about intervention methods to change attitudes toward disabilities among different groups of individuals. In this review, most interventions were found to improve attitudes towards people with disabilities. Professionals in the rehabilitation field would benefit from an understanding of the impact of interventions on attitudes and awareness about the harmful experience of those with disabilities in society. The research on these interventions demonstrated effective approaches to reduce attitudinal barriers toward people with disabilities.

Of the 35 studies included, 31 showed a positive attitudinal change among participants, and just four showed no changes in perceptions, behaviors or attitudes. Only Gannon and McGilloway (2009), Phadraig et al. (2015), Sinai, Strydom and Hassiotis (2013), and Zychlinski et al. (2016) identified no changes in attitudes. All the studies with positive results suggest that interventions increase awareness and perspectives on the experience of those with disabilities in society. For instance, participants explained that the experience of being in a wheelchair led to negative social interactions and physical barriers, which then caused feelings of inferiority and lowered self-esteem (Amosun et al., 2005). An increased sense of awareness could help to positively change current misperceptions and improve attitudes towards people with disabilities (Burke et al., 2013)

The majority of the studies (24) were carried out in many countries around the world with eleven in the United States. While most people in the United States may seem to agree with the rights of people with disabilities, there is still discrimination and prejudice experienced by people with disabilities (Smart, 2009). Globally, social and legislative changes have also attempted to reduce discrimination towards people with disabilities. Efforts to change stigma toward disabilities have been found to be effective, suggesting that contact between the general public and people with disabilities may positively change prejudicial attitudes, especially mental illness stigma (Corrigan & Penn, 2015). Using interventions toward disabilities would likely decrease negative attitudes, thus potentially improving the quality of life and social inclusion of people with disabilities. These findings support evidence based practices that can be used by rehabilitation professionals to decrease stigma toward disabilities.

If, as appears to be the case in this review, attitude intervention in all its various forms is almost always successful in improving attitudes, rehabilitation professionals and researchers should consider ways to incorporate these methods into practice. Knowledge and contact seem useable tools to influence attitudes in a variety of interventions. The findings reported by Fichten et al (2005) exemplified how volunteer contact had a great impact on reducing social distance while improving self-focused views of attitudes, comfort, and thoughts about disabilities, including more favorable views about people who have a hearing impairment. Rehabilitation professionals and researchers can use information to increase knowledge and promote contact as useable tools to influence attitudes in a variety of social and educational settings.

Contact can help to improve attitudes but having people with and without disabilities work together to achieve a common goal can have long term impact on attitudes (Johnson, 2006). Rehabilitation professionals can structure activities with consumers and employers as part of the rehabilitation process. In the work settings, rehabilitation professionals and clients with disabilities work together but collaboration on goal achievement can offer opportunities to decrease prejudice and stigma toward disabilities. Stigma can hinder goal attainment; however, involvement in evidence-based practices supports the achievement of life goals and reduces negative attitudes toward disability (Corrigan, Larson, & Rusch, 2009). Therefore, collaboration between stakeholders involved in the rehabilitation process – consumer, professionals, employers, among others -can contribute to promote inclusion and positive views of disabilities.

Nonetheless, Sinai, Strydom and Hassiotis (2013) suggested that didactic teaching and limited exposure to people with intellectual disabilities increases knowledge but may not be enough to improve attitudes. With this finding, rehabilitation professionals and employers might want to assess their audience to determine a feasible intervention before assuming that just any intervention would be effective in attitudinal changes. In order to effectively generate a potential positive shift in attitude toward disabilities, rehabilitation professionals need to evaluate each intervention separately. While assessing the intervention for attitudinal change, the rehabilitation professional should consider the cognitive ability, developmental stage, emotional readiness, previous experiences, and motivation of the targeted audience. These considerations can increase the effectiveness of the applied intervention to reach the goal of enriched quality of life for people with disabilities.

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Although this systemic review contributes to the value of interventions to change attitudes, there are some important methodological limitations. The search utilized only relevant databases and not a review of reference lists, as recommended by Bettany-Slatnikov (2010a, 2010b). Since it could be difficult to review each potential study, there is possible human error for excluding a feasible study. Due to discovering the ubiquity of international research on attitude intervention, the resulting 35 articles analyzed in this review were deemed representative, if not exhaustive. Another limitation is that the evidence comes mainly from cross-sectional attitude surveys using convenience and student samples. Results should be interpreted with reasonable caution considering potential methodological limitation and external factors that could influence the outcomes. Since 88% of the participant samples in this review showed a positive change in attitudes after being part of an intervention, rehabilitation professionals and instructors should keep these approaches in mind as an area of concern and attitudinal transformation.

It is recommended that future research should migrate from attitude intervention with small samples to broader inquiries into what effect improved attitudes have on societal inclusion of people with disabilities. Furthermore, research could also continue to assess interventions in community and vocational settings (Bartram & Cavanagh, 2019) as well as interaction focus on the human-animal bond (Silcox, Castillo, & Reed, 2014). Some of the studies reached larger audiences in public settings leading to a positive attitudinal change that could translate into opportunities for marginalized groups, improved policy, and voices for advocacy. As example of potential community impact, Kirkwood and Stamm (2006) explained that even though attitude changes were minimal in their study of Idaho citizens, the mild decreases in stigma and increases in awareness of mental health services resulted in a rise in referrals for children with mental disorders. In addition, research could also evaluate external and internal factors to better identify ways to change attitudes toward disabilities with short and long term impact including vocational interventions.

Conclusions

Therefore, a valuable contribution of this research supports that interventions can change attitudes towards disability fostering inclusion, equity opportunities, and quality of life. There seems to be an implicit understanding that interventions can enhance attitudes towards disabilities decreasing barriers and increasing social connections. Results highlight the role of attitudinal intervention with potential implication in vocational, recreational, social, and political arenas for people with disabilities.

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Need analysis of the production based entrepreneurship training model: learning entrepreneurship in higher education

Ganefri[1], Hendra Hidayat[2*)], Asmar Yulastri[1], Ifdil Ifdil[1]
[1]Universitas Negeri Padang, Indonesia,
[2] Universitas Bung Hatta, Indonesia,
*)Corresponding author, e-mail: hendrahidayatmpd@gmail.com

Abstract

The purpose of this study is to describe the needs analysis of production-based entrepreneurship training models in higher education. This is a quantitative and descriptive research with data purposively collected from 110 students that took entrepreneurship courses using questionnaires. The obtained data analyzed using the descriptive statistics method. Furthermore, this research was limited to the definition stage, which is to obtain information on the analysis of production-based entrepreneurship training needs seen from entrepreneurship learning. The results showed that the need for production-based on entrepreneurship training was categorized at a fairly good level, which contained elements of learning and teaching. Needs analysis is an important research activity used to obtain in-depth information as a basis for carrying out subsequent activities.

Keywords: Needs analysis, entrepreneurship training, production based.

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Introduction

Currently, there is a global increase in economic development with tremendous growth in trade and property, thereby impacting on the socio-economic life of various countries, including Indonesia (Antoni, Akmal, & Muslim, 2019; Antoni, Yuliviona, Kamela, & Muslim, 2020). According to Livingstone (2018), higher education which is properly developing in Indonesia is one of the driving forces for a nation's economy. However, there is still a gap in society's job market, thereby leading to high unemployment rates for higher education graduates. One of the advantages of higher education is its ability to provide skilled and professional workers needed by the job market. According to Mondragón-Vélez, Peña, Wills, and Kugler (2010) the demand in the labor market is very high, and the availability of quality resources in Indonesia allow for economic change and a better welfare level. Based on 2017 data obtained in a research carried out by Kemenristekdikti (2017), there are a total of 4,504 campuses in Indonesia. With these numerous campuses in Indonesia, graduates are expected to bring tremendous economic changes to the country's economy. Unfortunately, in reality, the economic conditions and the nation's welfare do not change significantly due to the number of unemployed college graduates.

Learning in higher education needs to be properly synchronized with society's development and the various demands of the job market. Currently, higher education graduates are less able to implement their knowledge in their professional field with low morale. Therefore, higher institutions need to ensure that

their educational curriculums are in line with the world of work, while graduates can create employment opportunities, rather than looking for jobs. In the last five years, the government, through the ministry of research and higher education, which is currently the ministry of education and culture, is actively and focused on offering various programs to improve students' soft skills. Some of these programs are scientific reasoning that strengthens students' hard and soft skills. Furthermore, campuses also have course programs to develop students' soft skills, such as entrepreneurship. The government also facilitates students by providing business funding assistance, on a national basis through creative and entrepreneurship programs. Essentially learning in higher education prepares graduates that have competences in their respective fields of knowledge and are also provided with entrepreneurial, technological, and social competences.

Entrepreneurship learning is designed for higher education graduates to survive and compete in the job market (Taatila, 2010) in accordance with the current digitalization era and the complexity of the nation's economic problems. Besides that, it is carried out to shape students' competence and entrepreneurial character. High morale, courage, interpersonal communication, teamwork, and discipline are some of the characteristics of entrepreneurship that are indispensable to today's higher education graduates. Similarly, marketing skills, scientific products (Antoni et al., 2019), reading market opportunities, creativity, and business innovation are some of the entrepreneurial competencies that need to be understood and implemented for students and graduates of higher education in Indonesia.

The materials used in higher education are not in line with the field practice because students are less enthusiastic, with the inability of the study plans to predict, understand and develop their self-potential, work ethics, responsibility, optimal communication and evaluation. Furthermore, learning entrepreneurship can become dull when students only listen to monotonous lectures and stories from the teacher, without competence and understanding of entrepreneurial character, because graduates prefer to look for jobs rather than open employment opportunities. Good entrepreneurship learning tends to positively impact on their readiness to open employment opportunities, thereby leading to a yearly decrease in the unemployment rate. Figure 1 is the latest data released by the Indonesian Central Bureau of Statistics.

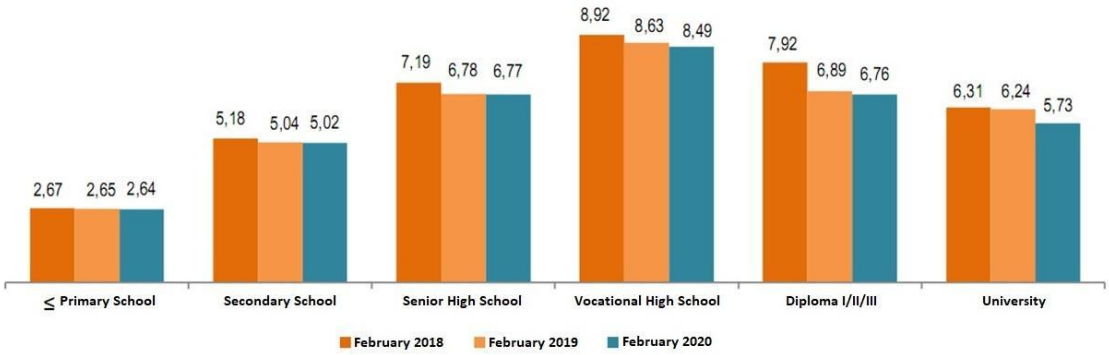

Figure 1. Open Unemployment Rate in Indonesia from February 2018-February 2020
Source: Central Statistics Agency, May 2020

Based on the Central Statistics Agency, unemployment has increased by 60 thousand people in the past years, with a decrease in the open unemployment rate to 4.9% in February 2020 (BPS, 2020). However, this condition does not include the negative impact caused by the outbreak of the Covid-19 pandemic. However, the National Development Planning Agency (Bappenas) predicts that due the pandemic, the unemployment rate in 2021 is likely to increase to 12.7 million people. In 2020 it is estimated that approximately 8.1 million people or 9.2% are going to be influenced by the open unemployment rate (TPT) (Thomas, 2020). Therefore, it is essential for higher education to immediately enhance entrepreneurship learning by providing alternative solutions through production-based entrepreneurship training models to students to enable them to compete in this globalization era. Entrepreneurship education and training is a process of facilitating individuals with concepts and skills to be able to recognize business opportunities and have insight, confidence, and ability to act (McIntyre, 2000). One of the training activities used to help develop active, creative entrepreneurial learning and training for students competence and character are through production-based training. This allows them to

produce various goods and services following the conditions of the curriculum set and according to the market and society's needs. Therefore, this study aims to describe the analysis of the needs of production-based on entrepreneurship training models in higher education.

Method

This study utilized the development research (Gall & Gall, 2003), with a quantitative descriptive approach used to examine the analysis of production-based entrepreneurship training needs in higher education. Furthermore, this research is limited to the definition stage, which is to obtain information on the analysis of production-based entrepreneurship training needs from higher education. Data were purposively collected from 110 students that took entrepreneurship courses at Bung Hatta University, Padang, Indonesia, using a questionnaire. The study was also carried out using a 4-stage model development. According to Akbar & Hartono (2017), the research and development stages were carried out with four stages of development, namely 1) Definition, 2) Design, 3) Development and 4) Distribution.

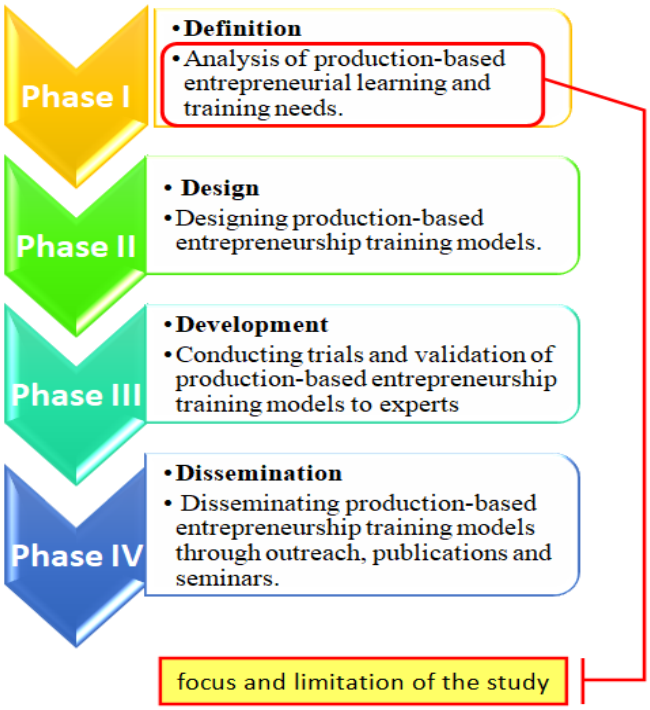

Figure 2: The framework for the research stages of the production-based entrepreneurship training model.

This needs analysis stage involves distributing questionnaires during the learning process and analyzing data using descriptive statistics. Several items were asked to students regarding 1) learning tools, 2) understanding and developing self-potential, 3) work ethics, responsibility, and pride, 4) learning implementation and planning, 5) knowing student character, 6) learning activities that we are educating, 7) communication with students, and 8) evaluation. In this process, students were asked to fill a questionnaire using the yes or no answer options. This means that from this questionnaire, information used to design and develop a training model production-based entrepreneurship model is obtained.

Results and Discussions

This study was implementation based on the four stages of the research, which starts with a needs analysis. In addition, it aims to determine and obtain information on entrepreneurship learning in forming a training model using the right analysis (Hidayat, Ardi, Yuliana, & Herawati, 2019; Hidayat, Tamin, Herawati, Khairul, & Syahmaidi, 2019). Production-based entrepreneurship training is generally similar to entrepreneurship learning. The only difference is that in production-based training, students are actively

involved and have a target of products to produce for commercial purposes, which are in line with each department's field and following market needs. According to Hidayat (2015), production-based learning provides students with the opportunity to develop thinking skills in higher education. The results of the needs analysis can be seen in Figure 3:

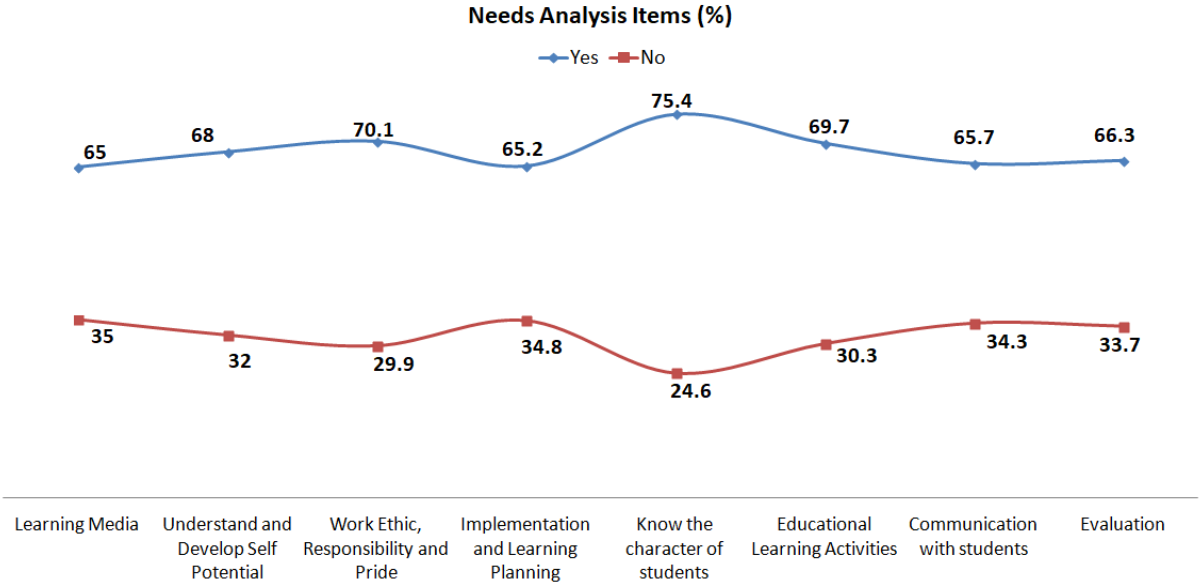

Figure 3. Graph of item analysis of entrepreneurial learning needs.

Data from the questionnaire filled in by students were descriptively analyzed to obtain an overview of the need for production-based entrepreneurship training. The need for an achievement response analysis of 8 (eight) aspects distributed to students taking entrepreneurship courses showed that an average of 68.18% and 31.83% of the students, provided Yes and No answers. The 31.83% of students that answered "No" indicates that they do not understand the importance of aspects of entrepreneurship learning. The item of analysis of needs in the highest category of 75.4% is student character, therefore, educators' need to pay adequate attention and consideration, to this aspect of entrepreneurship learning (Syam, Akib, Yunus, & Hasbiah, 2018). Meanwhile, the lowest score category is the learning device aspect with a value of 65%, is an integral part, and in accordance with Ganefri et al. (2018) research, which stated that it is a scenario and storyline for students and educators. The low-value category of the acquisition of filling out this questionnaire on the aspect of learning tools assumes that students do not understand the principles and essence of the importance of learning tools.

Furthermore, information was obtained in designing a draft production-based entrepreneurship training model using the needs analysis results, which found that entrepreneurship learning was at a reasonably good level. According to Lüthje & Franke (2003), entrepreneurship education and training aim to inspire students to arouse emotions and change mindsets. It also fosters entrepreneurship as a new mindset, and part of entrepreneurial education competencies (Edwards-Schachter, García-Granero, Sánchez-Barrioluengo, Quesada-Pineda, & Amara, 2015) (Karimi, Biemans, Lans, Aazami, & Mulder, 2016), based on learning experiences and training activities (Kakouris, 2017; Robinson et al., 2016). The study shows the importance of learning devices, especially in entrepreneurship (Ganefri et al., 2018; Hidayat, 2017a, 2017b), and in understanding as well as developing students' self-potential, such as ethics, character and a sense of responsibility learning (Hidayat, 2017; Hidayat, Yulastri, Sriwahyuni, & Zoni, 2018) (Hidayat, Ardi, et al., 2019; Hidayat, Herawati, Hidayati, & Syahmaidi, 2018; Hidayat, Herawati, Tamin, & Syahmaidi, 2018; Kusumaningrum, Ganefri, & Hidayat, 2015; Yulastri & Hidayat, 2017). This indicates that entrepreneurship learning considers need analysis, as well as the objectives, learning tools and characters integrated into the education.

Conclusions

In conclusion, the production-based entrepreneurship training model needs to be implemented in learning for all areas of expertise. Therefore, in order to design this entrepreneurial training model following the learning principles, it is necessary to have an initial study in the form of a needs analysis. The research data used in this study showed an average of 68.18% and 31.83% yes and no answers. Needs analysis is a critical research activity used to obtain in-depth information as material for subsequent activities. Production-based entrepreneurship training activities are an alternative in shaping entrepreneurship learning that allows students to develop thoughts, skills, and cooperation.

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Corona virus (COVID- 19) and education for all achievement: artificial intelligence and special education needs- achievements and challenges

Yahya Muhammed Bah[1], Myrtati Dyah Artaria[1*)]
[1]Department of Sociology, Faculty of Social and Political Sciences, Universitas Airlangga, Surabaya, Indonesia
*)Corresponding author, e-mail: myrtati.artaria@fisip.unair.ac.id

Abstract

The shortage of well-trained teachers especially in special education is a serious problem worldwide. To attain education for all as enshrined in the Sustainable Development Goals (SDGs), there is urgent need for robot ways of solving this problem with grave consequences for the future of children with disabilities and special education needs. Thus, education delivery methods like other services need to be innovative. The purpose of this studi is to examine the achievements and challenges in the application of AI for teaching children with special education needs. This research used the literature review method. The result of this study shows that AI has the power to enhance learning for children with special needs while curbing some of the problems such children are encountering in accessing quality and relevant education. In conclusion the findings revealed some significant achievements and the possibilities of more if the appropriate technologies are applied consistently with the right environment both in schools and homes.

Keywords: Education for all, children with disabilities, artificial intelligence, special education needs, achievements, challenges, COVID-19

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Introduction

Teachers play very critical roles in the socio-economic and political development of societies in addition to their principal duties imparting knowledge, creating classroom environment, role modeling, mentoring and nurturing, listening and looking out signs of discomfort, controlling, prompting, being a resource, assessor, organizer, participant, tutor, etc. Guyana Ministry of Education (n.d.).

In spite of these roles teaching is playing, there is great shortage of well trained teachers especially in special education; and is a serious problem worldwide. To attain education for all as enshrined in the Sustainable Development Goals (SDGs), there is urgent need for robot ways of solving this problem with grave consequences for the future of children with disabilities and special education needs. Thus, education delivery methods like other services need to be innovative. Information Communication Technologies (ICTs) have commenced to render such opportunities even in the delivery of special education needs through the Artificial Intelligence (AI) methods, Assistive Technologies (ATs) inclusive.

AI is differently defined by various authors. However, critical in most definitions is that it is an activity devoted to making machines intelligent with the ultimate objective of making it function

appropriately and with foresight in its vicinity. Therefore, it is a computer science meant to solve intellectual problems that are mostly associated with human intelligence like learning, problem-solving, pattern recognition, etc. similarly, it is critical in executing functions that require human intelligence namely; visual perception, speech recognition, decision-making, translation between languages, etc. Thus, it is purely computer systems that try to imitate human behavior, paving the way for personalized, adaptive learning, enabling advising systems that enhance students' experience. Similarly, it is being used for student assessment, enhancing the experience of students with disabilities, advancing the capabilities of learning analytics, etc. However, its application raises ethical, moral and privacy concerns. Its implementation in higher learning institutions is challenging though transforming other areas of academic life, too as it is highly associated with the advancement of higher education, Northonlinelearning (n.d.).

AIs including Assistive Technologies (ATs) to be productive both in the classroom and at home, the right tool must be selected, Adebisi R.O. et al., (2015). Assistive technology has the power to improve the life and living conditions of children with disabilities and above all eradicate some of the learning barriers.

Learning disabilities though cannot be treated and children grow up with it, with the right technologies, their learning abilities can be significantly improved (Raskind, 2000) as cited in, Adebisi R.O. et al., (2015). Assistive technologies are useful to children with disabilities in numerous ways such enhancement of the acquisition of basic knowledge and skills. Thus, they are educational tool just like pen and pencils for students without disabilities as they use to access all materials that can make them competitive in class and outside the classroom. All tools may not be necessarily user friendly and as such the type of tool to be used must be well determined and applied vis-à-vis the child learning needs and critically vital, they must facilitate both communication needs and changing environments; and the use must be continuous productivity, Adebisi R.O. et al., (2015). Assistive technology include among others, tape recorders, remote control, smart glasses or magnifier, cognitive hearing aids, parkinson's disease balancing application, lock-in syndrome, sign language, etc. (Quenneville, 2002).

AI including ATs is particularly useful for children who have difficulties in listening, mathematics, organization and memory, reading; and writing skills, Adebisi R.O. et al., (2015). In selecting the right ATs for children with learning disabilities, it is critical that the followings are put into serious consideration: the child's specific difficulties, establishing the child strengthens, involving the child in the selection processes, choosing the right ATs based on the child strengths and weaknesses, determining the specific location were the tool is to be used, selecting ATs that work well jointly, selecting ATs that are user friendly; and work well, Adebisi R.O. et al., (2015).

AI can do all that a human teacher can do including content creation, providing inspiration for learning, attending to difficult questions; and social interaction that are critical for effective learning (Johnson J. 2003).

However, a preliminary but intensive literature reviewed has revealed that there are no well documented Artificial Intelligence and Special Education Needs (SEN) delivery. Furthermore, this lack of systematic documentation beyond reasonable doubts has posed a great challenge for academics, human rights advocates, government institutions, NGOs; and social workers to both develop strategies and mobilize resources in supporting children with learning disabilities to access quality and relevant education. Thus, this research is meant to address this gap in order to contribute to the crusade; education for all.

The fundamental rationale for the literature review is to examine the present scale and degree of the application of Artificial Intelligence in the delivery of Special Education Needs (SEN), share knowledge to spark and inspire a process that will usher rapid growth from all directions in ensuring that AI and ATs are promoted and supported for children with learning difficulties to access affordable, quality and relevant education like all other children.

Method

A systematic review of the literatures using information collected from different sources was actuated. Google Search Engine was used to search for these articles. During the search numeration combinations of words and phrases were used to ensure articles reflect the most recent knowledge and

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scholarly publications. The systematic searches beget varied and voluminous articles which had to be sieved not only to meet the inclusion and exclusion criteria but to ensure the fundamental objectives of the study are wrangled.

Therefore, only peer-reviewed scholarly publications published after 2000 were selected except extracts perceived to be of basal mileage to the study. However, articles published by staunch international organizations known to have been working in special education needs delivery for years and has produced indefatigable knowledge in the area were stealthily appraised.

Inclusion and exclusion procedures

The underneath procedures were followed in articles inclusion. That is, only: 1) Peer-reviewed scholarly articles; 2) Peer-reviewed scholarly articles on AI and SEN delivery; 3) Peer-reviewed scholarly articles published from 2000 to 2020; 3) Articles on international or regional perspectives on AI and SEN; 4) Articles on AI and SEN published by internationals organizations with years of meritorious experience.

To exclude some articles from the review, the below captioned criteria were applied. That is: 1) Non-peer reviewed articles; 2) Articles published before 2000 unless critical and impactful; 3) Media generated articles including newspapers; 4) Articles not published in English language.

In spite of the fact that both qualitative and quantitative articles were trawled, only twenty seven (27) articles were qualified for reviewed which is largely due to a dearth of data. In essence, only peer-reviewed articles and publications by international organizations considered being trustworthy because they occasioned standard, ethical and robust studies were reviewed.

Results and Discussions

As can be observed above, the literature reviewed has disinterred a variety of AI and ATs in application to facilitate children with learning disorders to access affordable, quality and relevant education like all other children. To discuss these pernicious technologies or methods, they are codified into: imparting knowledge through addressing written language, reading, listening, memory; and solving arithmetic problems), creating classroom environment, role modeling, mentoring and nurturing, listening and looking out signs of discomfort, controlling, prompting, being a resource, assessor, organizer, participant; and tutor some of the fundamental roles of teachers.

Imparting knowledge

One of the fundamental roles of a teacher is to impart knowledge in student based on a designed and approved programmes. To impart knowledge, teachers apply different strategies ranging from one-on-one to group work sometimes with the support of simple teaching aids or more complex ones depending on the topics and the students being lectured, Keiler L.S. (2018). In case of children with learning difficulties different Assistive Technologies (ATs) including Artificial Intelligence have been applied as validated: ATs generally are helpful in ensuring that children with disabilities access education in several ways namely; in developing independence in academic and employment duties, participation in classroom debates and discussions, reaching out to peers, role models and teachers, self-advocacy, making the best use of the available educational opportunities, independence in living and learning with minimum support, performing side-by-side with fellows, mastering academic tasks, comprehending educational assignments with ease; and participation in communities' development programmes and recreational activities, Burgstahler, (2003). AI supports the creation of quality education, effective studies, study plan, adopt educational content, online student profile which can be used to assign a student a personal teacher. Thus, it can boost productivity both in the classroom and outside and above all, such portfolios delivered lessons and courses can be of great help to employers, Chassignola M. et al. (2018). AI is used in many educational sectors viz. content development, teaching methodologies, student assessment; and communication between teacher and students, Chassignola M. et al. (2018).

Similarly, in written language, ATs support students through spelling checker, proofreading or grammar checker, speech synthesizer, speech recognition, etc. Adebisi R.O. et al., (2015). Through variable speech control, optical character recognition, speech synthesis, tape recorder, Microsoft word, etc. ATs have increased students' independence in reading, Adebisi R.O. et al., (2015).

In the same vein, in mathematics ATs are supporting students with learning disabilities through talking calculators, electronic mathematic worksheet, etc. So too it is, in listening as ATs are helping students with learning difficult through FM listening systems, tape recorders, etc. Adebisi R.O. et al., (2015). In memorizing and organizing, ATs aid students with learning disabilities via personal data manager, free-form databases, prewriting organizers, etc. Adebisi R.O. et al., (2015).

In addition, AI has led to revelation and enhancement of many individual children's specific abilities, consolidation of research and education; and enhances optimal productivity for both learners and teachers, Pomsta K.P. et al. (2018). Thus, AI is critical in enhancing the formulation and implementation of culturally sensitive education while making the creation and production of knowledge much easier and affordable to support children with special needs, Almokaramah M. (2013).

Creating learning/classroom environment

For effective learning to take place, the creation of conducive environment is critical. With such an environment, the children are at ease and their brains relaxed, ready to absorb, participate and even sometimes challenge what is being delivered, Graetz K.A. (n.d.). The creation of such environment has witnessed the application of numerous strategies including computer generated support systems for effective learning, concurring with: AI in education is changing many things including conventional thinking, teaching, learning, traditional models of schools and classrooms, ability to tailor learning to the very needs of various students in light of their cognitive, emotional, instructional dimension. Similarly, it facilitates learning environment like content management, liberate teachers from bureaucracy management to focus on children's academic progress, etc. Mohammed P.S. et al. (2019). AI in addition to being very effective in e-learning, it is suitable for one-on-one learning, collecting data on users' interests and responding promptly without pressure and interfering with users' privacy, Almokaramah M. (2013). ATs promote sense of belonging and interactive participation, rate of assignment completion; and motivation for children with learning difficulties (Bryant & Bryant, 1998).

Similarly, AI while opening new opportunities in teaching and learning for the attainment of education for all, it is both challenging and fostering lifelong learning methodologies that can preserve the integrity of core values and the purpose of education, Popenici S. et al. (2017). Full-fledged robot teachers can be helpful in many areas such as being classroom assistant, student peer, building affective relationship with students, classroom management; and above all, performing high level cognitive action (Manyika et al., 2017) as quoted in Bosede I.E. et al., (2017). Thus, AI has demonstrated that effective and individually articulated approaches can be attained by applying AI techniques and intelligent learning environment, Mohammed P.S. et al. (2019).

Mentoring, nurturing and security

For students to develop to their fullest capacities, mentoring is fundamental. Teachers are generally known to be great mentors because they listen, encourage and motive students to both take the ownership of their education while building their confidence to face future challenges. With such, students are stirred to perform to their best with dedication and optimal seriousness, Eleyan et al. (2011). To create such atmosphere and aspiration in students, especially those with learning disabilities, technologies have made some impacts as substantiated by: AI as computer generated tool performs different functions including the stimulation of intelligence and problem solving skills. Furthermore, it is recognized as the most valuable application in the delivery of special education needs as it among others can diagnose disabilities and assigned appropriate interventions, facilitate children's interaction with their environment to escalate learning and quality of daily life, Drigas et al. (2012). AI is critical in special education as it doesn't injure anyone or through inaction, permit any person to be harmed. It always obeys orders given by a human being unless the order is harmful. It always ensures its welfare is highly protected as long as it doesn't harm a human being, Tucker E.A. (2016).

Listening and looking out signs of discomfort/diagnose

For any effective learning to materialize the students must be physically, mentally and psychological secured. Therefore, the security of children is a cardinal role in knowledge imparting. Teachers as protectors have been executing this role through different methods including observing behaviors, physical appearance, emotional stabilities, listening to concerns expressed by pupils, Valiente, C. et al., (2012). The teaching fraternity like others has enjoyed support of modern technologies in this regards as asserted: socially assistive robots (SARs) has assisted human development in many respects including physical

Indonesian Counselor Association (IKI) | DOI: 10.23916/0020200528630

assistance, therapy delivery, building behavioral skills, treatment and diagnosis of disorders; and analysis of human behaviors, Dickstein-Fischer L.A. (2017). AI has the capacity to diagnosis a student to enable authorities to design appropriate intervention methods to support him or her. Thus, AI doesn't only benefit students with special needs but even those working with them including parents and caregivers, Drigas et al., (2013).

AI has significantly contributed in diagnosing, evaluation, pedagogical psychology profiles, solutions, educational activities, strategies, skills; and tools that are fundamental in support of students with special needs, Ilkka T. (2018).

Similarly, AI has made assessment, identification of teaching and learning gaps easier and faster. However, it is not fault freed thus, occasionally; it needs human mentors, Chassignola M. et al. (2018). AIs have equally played significant roles in sports, self-driving cars, and diagnosis in healthcare facilities; and they have supported sexual partners in the social realm (Brandy, 2006) as cited in Bosede I.E. et al., (2017).

Teaching and learning resources

To effectively impart knowledge, the need for teaching and materials cannot be overemphasized. Teachers in their quest to deliver quality and relevant education have applied various strategies to acquire the needed resources, Kapur R. (2019). The unprecedented advancement in science and technology has significantly impacted their efforts as elucidated: AI facilitates the acquisition of interactive aid in solving problems, new domain knowledge, diagnosing disabilities, teacher easily getting psycho pedagogical evaluation of pupils who has learning disabilities; and importantly it provides a tool box for teachers to use in supporting children with special education needs, Almokaramah M. (2013). AI technology creates lot of opportunities for development of huge open online libraries, Chassignola M. et al. (2018).

Barrier removal and interventions

In the transfer of knowledge and skills, especially in special education, there has been lot of barriers soliciting immediate interventions to ensure children with learning disabilities enjoy access to quality and relevant education, a fundamental human to be enjoyed by all, Wright C.M. (2016). To remove these barriers and accord right interventions, educational institutional including teachers and philanthropists have employed different methodlogies encompassing AI as reaffirmed: AI provides data on accuracy, consistency, reciprocity; and immediacy that are fundamental in the interventions in support of children with learning disabilities in measuring their progress, Dickstein-Fischer L.A. (2017). Thus, it makes therapist affordable, accessible; and reduces the administrative burden on therapist, Dickstein-Fischer L.A. (2017). AI methods have significantly improved the quality of life of students with special needs education as it has successfully removed some barriers to learning. It integrates the freedom of action of the student and furthermore enhances the attainment of his or her personal goals, Drigas et al., (2013).

Profit making and other uses

Human being, in his quest to gather wealth with moderate expenses has always been exploring different avenues. In the area of alternative labor, lots of successes have been registered more especially with the advancement of science and technology, Emst E. et al., (2019). To safe cost while boosting productive, AI and ATs have made huge impacts as attested to: the growth of AI can be associated with many factors such as economic benefits of tireless labor, fueling automation since industrial revolution, the desire for teachers who do not pay regards to job dissatisfaction, recognition or remuneration, those with no need for autonomy, leaves, rests, and more especially those who are not limited by natural affective demands such as changes in moods, anger; and tiredness, Bosede I.E. et al., (2017). Robots although originally thought not to be capable of doing many things, today they are human co-workers in factories, as companion to students in class; and as support for students with disabilities, critically sick and elderly persons, National Academy of Sciences (2019). The economic rewards of tireless labor inspires the need for instructors who are unlimited by natural human demands, highlighting consideration for affordances of robotics and AI in education as currently happening in many aspects of human life, Bosede I.E. et al., (2017).

It reduces the workload and stress for teachers in the classroom while facilitating supportive education and inclusive, virtual learning and above all, lessen frustration, increase motivation, promote peer acceptance; and increase productivity both in class and at home, Adebisi R.O. et al., (2015).

Similarly, AI is profitable for both companies and the market in their functions for it means less human resources and less salaries payments, Chassignola M. et al. (2018). In addition to facilitating teaching and learning, AI is daily applied in cities, campuses around the world, internet search engines, smartphone features and applications, public transport; and household appliances, Popenici S. et al. (2017).

Limitations and challenges

Broadly, the application of science and technology in services delivery is not without limitations more especially in the least developed nations, Pholphirul P. et al., (2014). Thus, the use of AI and ATs in special education is no exception as affirmed:

In using the AI and ATs there are lot of challenges face both by the students and institutions that support the children viz. lack of ICT specialists, limited flexibility, limited disabilities friendly ATs especially in the developing nations, lack of government investment in support of ATs, public attitudes towards disabilities and children with disabilities more especially learning disabilities, lack of disabilities laws and policies and poor implementations where they exist; and lack of financial support particularly in third world countries, Adebisi R.O. et al., (2015). AI in spite of having the power to structurally change educational institutions both administratively, teaching wise and learning, it has the potential of posing some challenges to the sector namely; detecting irony, sarcasm, repetitive use of punctuation marks, use of capital letters or key phrases, Popenici S. et al. (2017). In developing countries its application is hindered by sparse and incomplete data, inadequate resources; and lack of technical skills, Mohammed P.S. et al. (2019).

ATs cannot eradicate learning difficulties however; learning to strengthen the technologies will improve the life and living conditions of students' with learning difficulties, Adebisi R.O. et al., (2015). Robotic personalities though capable of supporting students especially those with disabilities, it cannot be a perfect replacement for classroom teachers, Bosede I.E. et al., (2017). While AI is enhancing teaching and learning and above all, augmenting teachers' productivity, it is not yet ready to replace teachers, Popenici S. et al. (2017). AI though a beautiful replacement of human being in some areas, they cannot inspire humans, develop social skills; and emotional intelligence needed by teachers, Bosede I.E. et al., (2017).

AI effectiveness in education requires regulation to ensure they serve the purpose of their introduction in the system, Mohammed P.S. et al. (2019). AI needs to be formalized applying neutral, adequate developed techniques to ensure the cultural factors that regulate presentation, delivery and customization of content and system behavior, Mohammed P.S. et al. (2019).

Conclusion

In conclusion the findings revealed some significant achievements and the possibilities of more if the appropriate technologies are applied consistently with the right environment both in schools and homs. Notwithstanding, AI is not limitations immune.

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