Published in final edited form as:

Disabil Health J. 2020 January ; 13(1): 100827. doi:10.1016/j.dhjo.2019.100827.

Disability Advocacy Messaging and Possible Links to Underlying Disability Identity Development among College Students with Learning Disabilities and Attention Disorders

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Abstract

Background: Learning disabilities and attention disorders (LD/AD) are highly prevalent neurodevelopmental conditions that influence developmental trajectories and whose impacts exist throughout the life course. Self-advocacy skills are critical for college students with LD/AD, which are underpinned by understanding of self and one's disability.

Objective: This study examined disability advocacy messaging included in projects created by college students with LD/AD, compared patterns in disability messaging to existing disability

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Author Contributions:

All authors contributed extensively to the work presented in this paper. Study conception and design: CK, MFL, CYW. Acquisition of data: CK. Analysis and interpretation of data: CK, CL. CK and CL drafted the initial work and all authors contributed critical appraisal and revision for important intellectual content. All authors provide final approval of the version submitted for publication and agree to be accountable for all aspects of the work as presented.

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Declaration of Interests: Authors report no conflict of interest.

Data Accessibility:

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conference Presentations:

Unpublished preliminary findings were presented at the 2019 American Occupational Therapy Association Annual Conference and Expo, New Orleans, Louisiana, USA.

identity models, and explored changes in disability messaging during receipt of holistic campus-based LD/AD supports.

Methods: Participants were 52 undergraduates with LD/AD enrolled in a larger study. This one-group post-hoc analysis involved qualitative exploration of the projects' topical content, use of grounded theory procedures for conceptualizing the data, and quantitative analysis to explore changes over time in disability advocacy messaging.

Results: Participants messaged a broad range of disability-related topics. A five-level theoretical model of disability messaging was created from the textual data. The model evinces parallels to existing disability identity development models. A significant ($p < .01$) positive shift in disability messaging was observed in a comparison of messages from participants' first and last projects submitted over the four-semester period of study involvement.

Conclusion: Study findings support conceptual linkages among disability messaging and disability identity development. The resultant continuum model suggests a potential extension of existing disability identity development paradigms. Shifts in disability messaging provide preliminary evidence for potential personal and institutional benefits of engaging college students with LD/AD in disability-focused project creation.

Keywords

Self Concept; Learning Disorders; Attention Deficit Hyperactivity Disorder; Mixed-Methods; Psychosocial development

Introduction

Learning disabilities and attention disorders (LD/AD) are highly prevalent brain-based conditions that affect one in five young people in ways that markedly challenge learning despite average or above average intelligence.¹ These conditions, while primarily considered childhood disorders, have impacts throughout the life course.¹⁻⁴ Students with LD/AD comprise a majority of those reporting a disability to college disability offices.^{5,6} LD/AD-related symptoms impact academic performance and college completion,² as well as psychosocial functioning within postsecondary education.⁷ For young people with LD/AD, college success is influenced by self-advocacy and internal resilience factors, such as self-perception and a healthy identity.¹

Self-advocacy in College

College students with disabilities often face unfamiliar disability-related self-advocacy challenges. They must actively seek out needed disability supports, which is different from how supports are provided before college.⁶ While Section 504 of the Rehabilitation Act of 1973 protects access to (i.e., participation in) educational programs receiving federal financial assistance notable differences exist in the base federal laws ensuring disability accommodations. The Individuals with Disabilities Education Act (IDEA) safeguards disability resource provisions for high school students, while the Americans with Disabilities Act (ADA) ensures protections for college students. Under the IDEA, schools are responsible for providing needed disability supports. This is in contrast to the ADA,

which shifts the onus to students whereby they must actively request needed accommodations. As such, many students arrive at post-secondary schools unprepared to self-advocate or seek needed formal and informal supports.⁸

Self-advocacy in college requires young people to identify needs and articulate their disability-related experiences to campus personnel.^{8–10} For those with invisible disabilities, requests for needed supports can be especially challenging, as people may not readily recognize or understand their needs. This means that students with LD/AD must be able to identify what works and under what conditions the supports are helpful. They must know when, where, and how to reach out for the range of formal and informal supports needed within the classroom and for meeting broader expectations, such as those related to career development and social and daily life management.⁷ In short, students must be able to effectively communicate to others the nature of their LD/AD experiences and challenges.

Identity and Disability Identity

Identity serves as a foundational component of each young person's current and eventual sense of self and well-being in adulthood.^{11,12} The formation of identity during developmental periods, especially late adolescence and young adulthood, is critical for building a cohesive and meaningful sense of self.¹¹ Identity development is important in the establishment of both self-understanding and abilities needed to appreciate and contextualize personal strengths, challenges, and uniqueness.¹³ While identity is considered highly personal and intrinsic to the individual, both the development and expression of identity remains communal.¹⁴ Intimately tied to the actions a person takes and how those actions are interpreted by the individual and surrounding others,¹² identities are reflected in one's actions.¹⁵

Sense of self in relationship to disability is referred to as one's disability identity. Empirical understanding of disability identity development is sorely limited when compared with identity development of race, gender, and/or sexuality. For example, a reported 2016 search for peer-reviewed articles containing the phrase "disability identity" returned 52 articles, while a similar search for "sexual identity" and "racial identity" identified 2080 and 1275 articles respectively.¹⁶

To develop a cohesive sense of self, college students with LD/AD must make meaning of both their disability related challenges and their college experiences. This process requires students to understand and integrate their LD/AD into their evolving self-concept. Only a few models of non diagnosis-specific disability identity development exist, with none serving as a consensus model.¹⁶ Therefore, a greater understanding of disability identity development is crucial for guiding interventions that support the functioning and performance of young people with disabilities.

Purpose

Given the importance of self-advocacy and disability identity development for college students with disabilities, this study aimed to explore how content of LD/AD advocacy projects reflected development of disability-related identity. This study examined the advocacy projects created by undergraduates with LD/AD who were enrolled in a larger

campus-based study. The following questions were investigated: (1) what types of messages do participants with LD/AD convey through creation of advocacy projects, (2) what may these messages reveal about the creator's disability identity, and (3) does the nature of what participants communicate change, thus reflective of changes in disability-related identity?

Methods

Subjects and Setting

The advocacy projects were created within the context of a larger study that provided coordinated campus-based academic and psychosocial supports for science, technology, engineering, and math (STEM) students with LD/AD on a large research-intensive campus in the United States.¹⁷ The science fields were broadly defined to include social, behavioral, and economic sciences. The university's health science center institutional review board approved all processes; written informed consent was obtained prior to engaging in research activities. Undergraduate participants were registered with the campus disability office as eligible to receive accommodations related to LD/AD. At the time of study enrollment, the campus disability office categorized LD/AD to include disorders of reading, writing, math, coordination, auditory processing, language processing, and/or attention disorders. Recruitment used the disability office listserv, flyers, the project website, and word of mouth.

Participants were enrolled for four consecutive non-summer semesters. As part of the study, undergraduates engaged in: (1) monthly group psychoeducation and facilitated group discussions, (2) one-to-one mentorship, and (3) creation of disability-related advocacy projects. Participants created projects of their choosing that could subsequently be used to help others better understand their diagnostic conditions and/or LD/AD experiences. They were directed to focus their projects' messages for the purpose of promoting knowledge about LD/AD to any audience of their choosing; they were free to select the topic, nature, and mode of their specific projects. Additionally, undergraduate participants were reminded that they were experts in their own disability-related experiences and perceptions and were encouraged to share what they know. They were also instructed to generate projects that would become readied (e.g., closed captioning added) by study personnel for broad dissemination (e.g., internet). At the beginning of each academic year, participants were also encouraged to use their study-provided mentor as a sounding board for idea development; mentors were provided parallel information regarding instructions provided to the undergraduate mentees.

An ongoing and goal-directed engagement in the creation of the advocacy projects was to provide participants with an opportunity to reflect on, develop, and articulate salient disability-related knowledge, experiences, perceptions, and cognitions. It was anticipated that projects would be contemplated, planned for, and worked on throughout an academic semester as a means of involving the undergraduates in a tangible, personally meaningful, and non-threatening form of self-reflection and self-advocacy.

Design and Analysis

A one-group two-step sequential mixed-methods design was used.¹⁸ Qualitative analysis was implemented first to identify themes, patterns, categories, and relationships within project titles and descriptions.¹⁹ Afterwards, quantitative strategies were used to explore for changes over time in disability advocacy messaging.

Data sources and collection.—Qualitative data were textual records from each project's title and description, which ranged from single sentences to paragraph-length descriptions; these were submitted and/or confirmed during monthly meetings or as coordinated by the student and study staff (Figure 1). Most projects were submitted in digital format (e.g., video, Word document). Projects that were not provided in digital format (e.g., artwork) were photographed and returned to the participant if desired.

Qualitative analysis of students' disability messages.—Textual data were analyzed as to what aspects of the LD/AD experience participants chose to message, with emotions and values coding²⁰ used to capture affective aspects. Thematic analysis was used to identify patterns in disability-related experiences, attitudes, and judgments.²⁰ Axial coding was used to determine relationships among and dimensions within the conceptual categories.²¹ This enabled organization of the themes along a continuum of affective states (i.e., ordinal categories).

Messaging categorization and quantification.—Following identification of the ordered themes (i.e., ordinal categories), each project was individually examined and classified as to its categorical designation. Multiple coding cycles were used to determine each project's final categorical rating and consensus was required to finalize each project's rating.

In order to facilitate quantitative analysis, the model's five identified ordinal categories were assigned numbers that corresponded with the category's ordinal rank. Descriptive statistics were then used to examine the disability topics and the projects' disability messaging ratings.

Upon articulation of the continuum model, it was triangulated with three existing disability identity development stage models,^{14,22,23} of which one was specific to learning disability (LD). Triangulation of our resulting model was used to assess validity of the ordered nature of our model's identified categories and evaluate the model's consistency with disability identity development models that also encompassed personal and societal concerns.²⁴

Rigor in the qualitative analysis was enhanced during data reduction and code mapping through use of (1) consensus among multiple coders, (2) constant comparisons of the data to the emergent coding structure and categories, (3) analytic logs and memos, (4) regularly scheduled discussions regarding the analysis and reflexivity amongst qualitative analysis team members, and (5) periodic presentations of emergent findings to an interdisciplinary working group of qualitative researchers including clinical researchers from nursing, counseling, public health, and rehabilitation. Additionally, the multiple coding cycles and

authors' sustained interactions with participants allowed for deeper understanding and interpretation of the data.²⁰

Quantitative analysis - change over time.—Wilcoxon signed-rank test was used to explore for participants' changes in disability messaging. Pair wise comparisons were made between first and second, second and third, third and fourth, and first and fourth semesters. Comparisons were also made between the ratings from the projects initially submitted (i.e., submitted in the earliest time points) and those submitted at the time point furthest from the initial submission. For example, if a participant submitted a project in the first three semesters of study involvement, then the projects submitted in the first and third semesters were used for the fifth comparison.

In cases when a participant created more than one project ($n = 5$ participants) within a semester, the data point used for that participant was determined as follows: (1) the rating that appeared with the highest frequency (i.e., mode) was selected for use ($n = 2$); (2) when a majority was not possible, the value in the middle of the range (i.e., median) was selected ($n = 1$); and (3) when only two different project values were present, the lower, more conservative, value was selected ($n = 3$).

Results

Description of the Sample and Projects

Study sample included 52 undergraduates (25 [50%] males, 24 [46%] females, 2 [4%] not reported), of which 37 (71%) were white. Forty (77%) undergraduates contributed to at least one project, and 28 (54%) created more than one during their entire period of study enrollment. Of the 12 participants (23%) who did not submit a project, 8 eventually withdrew from the study. Four additional participants withdrew from the study but did submit at least one project. A total of 102 projects were collected for analyses; 97 were individually created and five were created by pairs. Twenty-three (44%) participants completed the expected number of projects (i.e., one per semester); 5 (10%) created more projects than expected.

A total of 12 discrete topics were identified within the dataset (Figure 2), with the majority of the 102 projects containing multiple topics; 38 (37%) contained only one topic. The 12 topics were included a total of 236 instances within the 102 projects.

Model of Disability Advocacy Messaging

A five-level theoretical model of disability messaging emerged from the data. The model is reflective of LD/AD self-advocacy and triangulates with existing models of disability identity development (Table 1). Categories within the model represent a sequenced progression and are numerically ordered as follows: 1 = Non-personal; 2 = Connecting to Self; 3 = Pros and Cons; 4 = Positive; and 5 = Connecting to Society. Category 1 (Non-personal) reflects messages that did not contain discernable personalization of the message, with categories 2 through 5 conveying personalization within the messages expressed. Categories 2 through 5 were differentiated by the primary emotionality conveyed. Projects included in category 2 (Connecting to Self) contained primary dimensions of neutral or

negative emotionality. Projects rated as 3 (Pros and Cons) contained a balance of both negative and positive emotionality. Projects rated as 4 (Positive) contained primarily positive or only positive emotionality. Projects in category 5 (Connecting to Society) contained messages of belong and/or desires for improving other's disability experiences or understanding. Comparison of our model's categories with existing models of disability identity development affirmed both the (1) conceptual parallels to disability identity development, and (2) the ordered nature of our model's categories (Figure 3).

Description of Project Ratings

Amongst all projects created, the most frequently represented disability messaging rating was category 2 (Connecting to Self; [34%; $n = 37$]), which was also the mode rating for the individually-created projects ($n = 97$) and the projects created by pairs ($n = 5$; Figure 4).

For participants who submitted multiple projects in a single semester ($n = 5$), only one submitted multiple projects with equal disability messaging ratings. The remaining four created projects with disability messaging levels that differed within the same time point. For example, one participant's projects had messaging ratings of 1 (Non-personal) and 2 (Connecting to Self) in the first semester of study enrollment. This participant also submitted four projects in the fourth semester with ratings of 2, 2, 4 (Positive) and 5 (Connecting to Society).

Changes in Disability Messaging.

Differences in disability messaging ratings from individually-created projects showed significant increases ($p = .006$; $n = 28$) when comparing ratings from initial projects to ratings from projects submitted at the time point furthest from the initial. There was an increase in disability messaging rating for 19 participants (68%); no change for six (21%), and a decrease observed for three (11%). No other comparisons were significantly different. However, differences between first and fourth semester ratings approached significance ($p = .07$) with $\alpha < .01$ using Bonferroni correction of $p < .05/5$ (Table 2).

Discussion

This study examined disability-focused messages within projects created by undergraduates with LD/AD for the purpose of advocating, educating, and raising awareness. Messages varied and spanned broad disability-related topics, such as stigma, as well as topics specific to LD/AD-related symptomatology. A theoretical continuum model was developed with notable parallels to the components and structures of existing disability identity development models. Additionally, increasing disability messaging ratings were detected across time points suggesting positive changes in disability identity development.

Our resultant model describes disability messaging as occurring along a theoretical continuum of personal and societal levels, which parallels progressions delineated within published disability identity development models. The model reported by Higgins et al.²³ focused on individuals with LD coming to terms with the LD and being labeled with a disability. Gill's 1997 seminal work presents a stage model describing a combined individual and societal integration of disability identity.²⁵ Notably, existing disability

identity development models end with the individual's identification with a larger disability community.^{16,26} Our model's final level is one where individuals with LD/AD not only see themselves as a member of a larger society but also understand their LD/AD as only one facet of who they are, and whose experiences can be contributive for improving others' understanding and experiences. This finding conceptually extends existing disability identity paradigms beyond disability acceptance/identification with disability communities and advocacy for one's disability community; thus the identified model warrants serious consideration.

Five of 52 participants (9.6%) created multiple advocacy projects within a single semester, with four creating projects with different disability messaging ratings within the same time point. Upon closer inspection of the discrepant ratings, we observed that topics covered in the messages with higher ratings (e.g., 4 or 5) were specific to areas the participants were able to make strategy or actionable recommendations for. Projects with lower ratings were related to areas of life where the students had limited ability to effect change; topics included experiences of stigma, policies surrounding medications, and feelings of being overwhelmed by academic load. The existence of multiple levels of disability messaging ratings within the same time point suggests the possibility of concurrent varying levels of disability identity development that may be differentiated by discrete functional domains. A better understanding of identity development in relationship to a disability status and functional domains is needed and is important for guiding interventions.

Changes in participants' disability-related messaging during four semesters of study enrollment were also explored; positive changes (i.e., higher disability messaging ratings) were detected. The observed significant changes signal a potential benefit to supporting and engaging college students with LD/AD in disability messaging as a form of self-reflection and self-advocacy. Because self-advocacy is an important predictor of college adaptation²⁷, additional studies that specifically test the benefit of incorporating disability-related projects within self-advocacy interventions should be conducted. This finding also provides preliminary evidence that types of messages included in disability messaging might be useful as an intervention outcome indicating changes in the creators' self-identities.

Given findings from the triangulations of the resultant model and the model categories' observed sensitivity to change, additional research is merited to further test the resultant theoretical model. Modern test theories, such as Rasch analysis, can be used to test the hierarchy of the categories identified and may discern if a hierarchical ordering exists for the neutral and negative dimensions found in category 2 (Connecting to Self). Examination of relationships among constructs in our model would be an important step in advancing understanding of disability identity development. Such studies could potentially result in development of a much needed disability identity measure, as few measures currently exist.

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Limitations and Future Studies

This study explored potential linkages among disability messaging and disability identity; because of its exploratory nature, findings should be approached with caution. The following may limit generalizability and interpretations: (1) secondary analysis of one component of

the multiple interventions included in a larger multi-component study, (2) brevity of the textual data, (3) small sample sizes for comparisons between semesters, and (4) use of a one-group convenience sample of STEM students from one large public research-intensive university. Findings from the STEM students and students from large universities may have limited generalizability to non-STEM students or students from smaller colleges, as their experiences of disability impacts may differ.

We focused on exploring potential benefits of engaging in creation of disability advocacy projects as supported within the context of a larger programmatic intervention. Advocacy projects were only one of multiple interventions provided and, thus, observed effects cannot be clearly attributed to implementation of the advocacy projects. The lack of a control group also hinders ability to determine if changes observed can be attributed to the interventions and contributes to difficulties in drawing conclusions about benefits conferred from creation of advocacy projects.

Though these post-hoc findings indicate potential parallels between disability messaging and disability identity development, they may actually refer to different things. Because the projects were not expressly created to depict the creator's perceived disability perceptions or experiences, we cannot be certain that the disability messages actually reflect the creator's identity. Future research should be designed that specifically elicits direct information about the relationship between creation of disability messaging and disability identity. A more in-depth qualitative analysis of all the contents related to the projects (e.g., auditory and visual data from videos) instead of the textual titles and short descriptions may yield more robust information about what participants intended to message.

Sample sizes that were available for pair-wise comparisons of project ratings ranged from 15 to 28, with 28 available for comparing the initial and the final project ratings, which was the only significant difference detected. Small sample sizes may have limited the power needed to detect differences in all but the one comparison; an in-depth qualitative analysis will permit a more robust assessment of changes over time.

Future studies should also investigate linkages among the topics messaged and the levels of personalization and emotionality contained within the messaging. Analytic methods such as network analysis may be useful in quantifying relationships among topics messaged and the model's identified disability messaging categories and could advance understanding of linkages among disability messaging and identity development.

Implications for Health Professionals

Rehabilitation and psychological professionals, in their therapeutic processes for fostering adaptive and functional abilities, are uniquely situated to shape clients' perceptions of personal capabilities and thus foster positive self-conceptualizations. These professionals are critical sources of anticipatory guidance for students with disabilities.⁷ They are well-positioned to support disability-related self-advocacy and cultivate the valuing of personal uniqueness, which can foster a positive disability identity development.

Implications for STEM Educators and Educational Institutions

Students in STEM fields can be challenged to balance rigorous academic demands with disability related needs.^{17, 28} The high prevalence of LD/AD means that educators will likely teach students who have some form of learning or attention challenge, and as such, can gain beneficial insight from messages created by students with LD/AD. Such insights are important for fostering student success.

Conclusions

Study findings support conceptual linkages among disability messaging and disability identity development. Discernable quantitative changes (i.e., higher ratings) in disability messaging ratings signal potential positive gains in disability identity development for study participants who engaged in creation of disability advocacy projects as part of a larger program of campus-based holistic interventions. Findings from this study contribute to the understanding of relationships among one's advocacy actions, articulations, and identity development related to disability. The theoretical continuum model that emerged from the data points to an extension of existing disability identity development paradigms to one that extends beyond identification with a disability group to identification as a societal member whose difference is only one facet of the identity. When afforded the opportunity, college students with LD/AD in STEM articulated a broad range of disability-related messages for dissemination on their college campus and beyond. Students with LD/AD, as well as the educational environment, can benefit from disability-advocacy project creation and dissemination.

Acknowledgements

Authors thank research assistants for their assistance with data analysis, as well as our research collaborators, participants, and campus partners for their commitment to this work.

Funding:

This research is based on work supported by the U. S. National Science Foundation under Grant Number HRD-1246587. This work is also supported in part by the NIH National Center Medical Rehabilitation Research (NICHD; K12 HD055929). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation or the National Institutes of Health.

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Title: Unified Thought

Description: It is well known that students with learning disabilities or differences think in a non-linear fashion but few know that such differences lie in the structure of the brain.

Non-linear thinkers view their thoughts in vibrant colors, interacting with one another and compounding the thought process which can be referred to as chaos.

On the other side, traditional comprehension is laid out in an orderly fashion with each thought following a rational pattern similar to waiting in line at the bank.

I've chosen to display these two systems in a bowl fashion to demonstrate that both mentalities are beautiful and can create functional peace by working together.

Project:

Figure 1.
Example of disability-advocacy project title, description, and the corresponding project.

Figure 2.
Occurrence of topics within 102 disability-focused advocacy project titles and descriptions.

Disability Messaging Categories	Higgins' et al. (2002) Stages of Acceptance of a Learning Disability	Gibson's (2006) Disability Identity Model	Forber-Pratt and Zape (2017) Model of Social & Psychosocial Disability Identity Development
1. Non-personal	<u>Stage 1: Awareness of a Difference</u> <ul style="list-style-type: none"> Academic differences Academic-related differences Non-academic differences Normative value judgements Adaptive value judgments Affective/behavioral domain 	<u>Stage 1: Passive Awareness</u> <ul style="list-style-type: none"> No disability role model Medical needs met Taught to deny social aspects of disability Disability becomes silent member of family Shy away from attention Will not associate with others with disability 	<u>Acceptance Status</u> <ul style="list-style-type: none"> Become disabled and/or born with disability
2. Connecting to Self	<u>Stage 2: The Labeling Event</u> <ul style="list-style-type: none"> The diagnostic process <u>Stage 3: Understanding/Negotiating the Label</u> <ul style="list-style-type: none"> Struggling to understand what having a learning disability means Resolve confusion as to what type of help needed in school environment 	<u>Stage 2: Realization</u> <ul style="list-style-type: none"> Begins to see self as having a disability Self-Hate Anger: Why me? Concerned with how others perceive self Concerned w/ appearance "Superman/woman" Complex 	<ul style="list-style-type: none"> Person accepts own disability Close friends and family are accepting of the disability
3. Pros and Cons	<u>Stage 4: Compartmentalization</u> <ul style="list-style-type: none"> Minimize weaknesses and maximize strengths 		<u>Relationship Status</u> <ul style="list-style-type: none"> Person meets others like herself/himself Engages in conversation with these individuals Learns about the ways of the group
4. Positive	<u>Stage 5: Transformation</u> <ul style="list-style-type: none"> Learning disability as a positive force in one's life 	<u>Stage 3: Acceptance</u> <ul style="list-style-type: none"> Shift focus from "being different" in a negative light to embracing self Begins to view self as relevant; no more no less than others Begins to incorporate others with disabilities into life Involves self in disability advocacy and activism Integrates self into majority (able-bodied) world 	
5. Connecting to Society			<u>Adoption Status</u> <ul style="list-style-type: none"> Adopts the shared values of the group <u>Engagement Status</u> <ul style="list-style-type: none"> Become a role model for others with disability Help those who may be in other statuses Give back to the disability community

Figure 3.
Comparison of messaging categories from the data with published disability identity models.

Figure 4.
Frequency and proportion of disability advocacy messaging categories for projects submitted.

Table 1.

Continuum of disability advocacy messaging, category definitions, and representative textual data.

Messaging Category	Messaging Category Definition and Example of Representative Data [Participant Identifier]
1. Non-personal	<p><u>Definition:</u> Declarative information about disability and not personalized or related to self.</p> <ul style="list-style-type: none"> <u>Example 1:</u> Accommodations: The different types of accommodations the Disability Resource Center offers for students with LD at the University. [U1] <u>Example 2:</u> Learning Disabilities at the University Level: Defining what a LD is, what the DRC is and who to contact any of these two topics; Also attached, quotes from famous people who had LD. [U43]
2. Connecting to Self	<p><u>Definition:</u> Disability information portrayed in a personalized way, but having dimensions of emotional neutrality and/or negative connotations regarding disability experiences.</p>
<i>Neutral dimension</i>	<ul style="list-style-type: none"> <u>Example 1:</u> ADHD 101: Informative PowerPoint about ADHD. How to identify it, the myths associated with ADHD, the subtypes of ADHD, diagnosing/treating ADHD and my personal experiences with ADHD. [U47] <u>Example 2:</u> "Dyslexia Haiku": Personally growing up with dyslexia. [U3]
<i>Negative dimension</i>	<ul style="list-style-type: none"> <u>Example 1:</u> Rain Clouds: This painting illustrates the negative aspects of living with a learning disability and how it affects life in social and academic settings. [U16] <u>Example 2:</u> The SS World "Drowning": A student is drowning in the sea of academics while reaching for the S.S. World Ship. However, along with tossing the life saver into the water, the ship continues to throw more books and academic pieces overboard. This is the artist's rendition of learning disabilities. [U52]
3. Pros and Cons	<p><u>Definition:</u> Messages describing a balance of optimism or advantages and challenges of having a disability; messaging presented in a personalized way or indicative of personal experience with content.</p> <ul style="list-style-type: none"> <u>Example 1:</u> Studying with ADHD: This is a look into the distractions that people with ADHD face; even the simplest tasks can be difficult to focus on, but once something actually grabs our attention, we tend to do very impressive things. [U2] <u>Example 2:</u> How I learn with Dyslexia: Explaining to a friend how I learn with dyslexia. Dyslexia is more than just reading words backwards and having issues comprehending. It includes having a hard time understand and forming words. However, it allows me to break things down into simpler terms to better understand things and make detailed instructions for myself and others. [U29]
4. Positive	<p><u>Definition:</u> Description of positive aspects of disability or message that signified optimism; messaging presented in a personalized way or indicative of personal experience with content.</p> <ul style="list-style-type: none"> <u>Example 1:</u> Horizons: Disability is often characterized by the often times messy appearance it gives on the outside. I wanted to show that a mind with LD is beautiful on the inside. I drew a horizon in the brain to show that the possibilities are endless, and that even though it gets cloudy, the horizon is bright. [U49] <u>Example 2:</u> About LD: How my LD makes me learn about diversity and perseverance. [U22]
5. Connecting to Society	<p><u>Definition:</u> Messages that work to improve others' disability-related experiences and/or explicate societal membership whereby disability is only one facet of the individual members.</p> <ul style="list-style-type: none"> <u>Example 1:</u> Normality: When we see each other, we should realize that there is something different in all of us. We should not fear the difference. We should embrace it, and educate others so that there will be no difference. [U52] <u>Example 2:</u> Letter to Educators -- Reimagining Perspectives on Students with Learning Differences and Stigma in STEM: It's a letter to faculty explaining, from my experiences, what to consider or practices to try to better engage and encourage success for students with disabilities. [U14]

Table 2. Comparisons of participants' disability messaging ratings across four semesters of study involvement.

Comparisons (<i>n</i>)	<i>Z</i> statistic	<i>p</i> -value*
Semester 1 and semester 2 (20)	.955	.339
Semester 2 and semester 3 (15)	.718	.472
Semester 3 and semester 4 (15)	.360	.719
Semester 1 and semester 4 (17)	1.815	.070
First and last project submitted (28)	2.776	.006

* 2-tailed significance set at $p < 0.01$ using Bonferroni correction of $p < .05/5$