Opportunities and Barriers to UDL-based Course Designs

Sujit Varadhan, Xiuhao Ding, Delu Zhao, Ananya Agarwal, David Dalpiaz, Chrysafis Vogiatzis, Yun Huang, Lawrence Angrave, Hongye Liu

University of Illinois Urbana-Champaign

INTRODUCTION

Throughout educational institutions, **the needs of students with disabilities (SWD) are not effectively met.**

Our study provides empirical findings about the **opportunities and barriers to implementing UDL practices** with the end goal of developing more inclusive courses.

This poster presents **findings from two UDL-based surveys designed to gauge student and faculty experiences and opinions with course instructional features** (e.g., recorded lectures, video transcripts, frequent low stakes tests, an official discussion platform).

Data about student demographics (college major, gender identity, disability status, disclosure status) **were collected and analyzed** to identify significant differences between these populations.

BACKGROUND AND METHODS

Students with disabilities are severely underserved in the education system. Many students have a disability, but most students who self-reported a disability did not report it to their instructors or school [1].

Our study considers students with access challenges and accommodation needs (SACAN), whom do not have a university recognized disability but face other issues preventing them from attending class.

Universal Design for Learning (UDL)

Universal Design for Learning **(UDL) is an inclusive pedagogical framework and set of principles to improve learning for all students** by emphasizing the importance of accommodating multiple modes of student learning, action, and engagement.

UDL organizes a large set of best practices into **four key principles: Representation, Engagement, Action-expression, and Accessibility** [2].

Survey Design and Analysis Techniques

A survey for students and a survey for instructors were conducted to assess the knowledge, usage, and usefulness of 16 UDL features.

Both **Likert scale and free-response questions** were asked. Data analysis tests includes Cronbach's Alpha, Mann-Whitney U, and Chi-Square.

RESULTS

Opinions of All Students

The top five useful UDL practices for all students are:

1. Recorded lectures that students can search for content
2. Flexible assignment deadlines
3. Transcripts and captions on course related videos
4. Official discussion platform
5. Alternative learning formats to lectures (textbook, slides, etc.)

Aggregated Type	Frequency Experienced		Perceived Usefulness	
	Mean	Pos%	Mean	Pos %
Flexible assignment/assessment deadlines	2.93	32	4.52	93
Gamification (points systems, Kahoot!, achievements, etc.)	2.12	15	3.67	61
Frequent low-stake tests	2.6	22	4.08	79
Utilizing props or physical objects in teaching	2.34	16	3.7	64
Anonymous polls on course content	2.59	26	3.91	70
Alternative assessments (such as presentations)	2.47	18	3.71	62
Recorded lectures that students can search for content	3.64	60	4.61	95

Comparison between UDL practices' frequency experienced and their perceived usefulness ranked by students

- In general, **students do not experience UDL practices as much as their usefulness may suggest**
- The top useful practices such as "Recorded lecture with searchable content" and "flexible deadlines" were not experienced very frequently

Opinions of Students with Disabilities

Question	Mean SWD	Mean SWOD	Positive SWD %	Positive SWOD %	p_val	corrected p_val
Recorded lectures that students can search for content	3.12	3.91	40	70	<0.001	<0.001
On-boarding form for accessibility	2.08	2.79	8	24	<0.001	0.002
Anonymous polls on course content	2.22	2.78	18	30	0.002	0.013
Alternative learning formats to lectures (textbook, slides, etc.)	3.38	3.85	48	69	0.003	0.013
Accessibility checker for webpages	2.38	2.94	12	35	0.005	0.014
Official discussion platform (Discord, GroupMe, etc.)	3.3	3.75	44	68	0.008	0.021
Flexible assignment/assessment deadlines	2.62	3.09	22	38	0.01	0.023
Auto-graders	3.86	4.21	68	85	0.017	0.033
Frequent low-stake tests	2.36	2.72	16	26	0.041	0.074

Significant differences between SWD and SWOD regarding frequency

- **SWD experienced significantly less frequently than SWOD** for half of the UDL practices
- SWD experienced significantly less frequently for all four UDL practice types.

Question	SWD Mean	SWOD Mean	SWD Pos %	SWOD Pos %	p_val	corrected p_val
Auto-graders	3.54	4.17	54	80	0.001	0.012
On-boarding form for accessibility	3.74	3.27	58	37	0.003	0.024
Frequent low-stake tests	3.8	4.22	66	86	0.009	0.047

Significant differences between SWD and SWOD responses regarding usefulness

- **SWD ranked accessibility and engagement features significantly higher** than SWOD

Opinions on Feedback Methods

- **Female students and SWD are significantly more uncomfortable giving direct feedback** to instructors
- **Anonymous Google forms are the most preferred method of feedback** for all students (74%)
- **SWD and SACAN felt less comfortable about having intermediary groups** to relay feedback

Opinions on Class Format

- **Most students rank lecture-based classrooms the highest** (76%) and **fully synchronous online classrooms the lowest** (33%)
- **Female students consider the usefulness of flipped classrooms lower** than male students

RESULTS (Continued)

Instructors

- Instructors reported that there are **No Barriers** to implementing most of the UDL practices
- **Instructors are least knowledgeable about accessibility features** (Text-to-Speech, Immersive reader, On-boarding form for accessibility needs) **and engagement features** (Gamification) and indicated that **accessibility features have the most barriers to implement**
- Most Instructors learned about UDL practices by their own initiative. Many however answered that they **were not given training and were not aware of the issues** being solved by UDL

CONCLUSION

- **Searchable lecture recordings and flexible deadlines** were the top two useful practices ranked by students, but they were rarely experienced
- **Lecture recordings are an accessible way for students to learn** and review course content. SWD can benefit from recorded lectures
- **Feedback mechanisms are imperative** for meeting and evaluating the needs of students
- **Instructors agreed but also differed from students** for the usefulness of the top practices ranked by the students

Limitations:

- Small number of responses from instructors
- Small number of students with physical disabilities (e.g. blind/low-vision, deaf/hard of hearing)

REFERENCES

[1] Hamrick, (2019) Women, minorities, and persons with disabilities in science and engineering. Special report NSF 19-304

[2] Boothe et. al., (2018) Applying the principles of universal design for learning (UDL) in the college classroom. *Journal of Special Education Apprenticeship*

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