

## **Accessibility Nuggets, Video Vignettes, and Other Instructor Development Approaches to Foster UDL Adoption and Inclusive Engineering Education**

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Accessibility Nuggets, Video Vignettes, and other Instructor Development approaches to foster UDL adoption and Inclusive Engineering Education

## **Abstract**

Students with disabilities need accessible courses. Universal Design for Learning (UDL) has become a well-known approach to creating inclusive and accessible education. However, despite general interest around UDL among instructors, previous studies have revealed the lack of resources to adequately educate instructors on UDL, accessibility principles, and best practices.

This study details multiple methodologies at the University of Illinois Urbana Champaign used to educate and inspire instructors about UDL with the goal of creating more accessible engineering courses. We implemented multiple approaches to increase interest in, and utilization of, UDL by instructors: 1) Developed a Learning Management System (LMS) based training course which gave instructors “plug-and-play” practical examples of UDL design practices; 2) Created short tips (“Accessibility Nuggets”) to inspire interest and show the starting points; 3) Provided hands-on help for non-UDL based engineering courses to make them more accessible; 4) Surveyed students and instructors about UDL practices.

We report the results of several methods of instructor engagement practices including: 1) Canvas training modules about implementing UDL at beginner, intermediate, and expert levels of difficulty; 2) Newsletters about UDL sent to instructors along with statistics including: number of subscribers, number of views per week, visits to linked resources and the feedback from subscribers; 3) Prerecorded video tutorials about utilizing various UDL tools at the University of Illinois Urbana-Champaign and motivational videos (vignettes) about why UDL is important.

Our study provides insight into how best to foster interest and provide education around UDL. Our end goal is to increase utilization of UDL in the classroom at the University of Illinois Urbana-Champaign. We will provide open training materials for use in other universities.

## **Introduction**

This paper presents the implementations and outcomes of multiple instructor engagement practices during the Fall 2023 and Spring 2024 semesters at the University of Illinois Urbana-Champaign. These engagement practices were designed to share UDL design practices and tools, some of which were previously developed by this research group. Interpersonal methods of outreach and collaboration with university groups were combined with an online presence through weekly Nuggets newsletters and blogs to jumpstart accessibility dialogue with instructors. Aiming to foster interest and provide education around UDL with the goal of increasing utilization of UDL, we adopted the three approaches of 1) Canvas training modules; 2) Nuggets newsletter; 3) Prerecorded video tutorials.

To produce interpretable results, data like web traffic statistics were collected for subsequent user engagement analysis. Current evidence suggests that, by providing short-commitment informational tidbits and generating multiple backlinks for UDL resources, weekly newsletters help boost UDL visibility, as measured by subscriber counts and by traffic into linked websites. In this paper, along with providing further evidence on the efficacy of the given engagement practices, open training materials and UDL resources will be shared for use in other universities.

## **Background**

### *Universal Design for Learning (UDL)*

UDL is an inclusive pedagogical framework and set of teaching principles that emphasizes universal approaches of accommodating multiple modes of student learning, action, and engagement, in order to improve student learning. More specifically, UDL can be broken into three core organizing principles, which are 1) distributing multiple modes of content delivery to students, 2) offering students multiple ways of expressing their learning, and 3) providing multiple means for engagement and motivation. This enables all students, including students with disabilities (SWD), to effectively utilize the classroom and meet learning goals. Examples of UDL tools are onboarding forms, frequent low stakes tests, and flexible assignment deadlines [9]. A significant portion of UDL research analyzes the effectiveness of UDL guidelines and innovates with new UDL tools, but this paper addresses the problem of engaging instructors with UDL concepts and practices.

### *Opportunities and Barriers in UDL Adoption*

Previous studies on knowledge of UDL-based best practices by faculty have found high-motivation and high interest among faculty to learn more about UDL [12]. However, there are also barriers in implementing UDL techniques [13]. A recent paper that statistically analyzed instructors' perceptions of UDL similarly suggested the high motivation and even initiative among instructors to implement UDL techniques, but also found that the most dominant barrier to further usage of various UDL tools was simply a lack of knowledge or time [16]. The paper also highlighted differences between student and instructor perceptions of how useful specific UDL practices were to students. For example, when compared to students, instructors over-emphasized frequent low-stake tests and anonymous polls on course content as useful educational features, while under-emphasizing recorded lectures and flexible assignment deadlines. These insights introduce a strong motivation for the work presented in this paper, which is to bridge the gap between latest research on UDL and instructors' understanding of UDL.

## **Methods**

### *Development of the training course on Canvas*

The team researched the existing accessibility and UDL practices and then created a training course as an open Canvas course with the following goals:

1) Help the instructors understand the needs and perspectives of the students especially the students with disabilities 2) Help the instructors understand the law and regulations regarding accessibility 3) Help the instructors in a concrete fashion by providing a library of basic and advanced UDL practices 4) Provide examples and templates that can be plugged into courses easily by the instructors.

For the first goal, we conducted a focus group interview with 6 representative SWDs to understand their experiences, perspectives about UDL and expectations for course policy. The interview was recorded with anonymous identity and made into shorter audio clips to be adapted to the course. The research group defined the structure of the course, which topics or practices to cover, a general template for each entry, and divided the work among the faculty and the student research assistants. Overall, the pages were organized by background, importance, a how-to section and a feedback section. In the feedback section, we provided links for readers to a forum on Canvas or a Microsoft team based open forum. Each best practice was categorized by the research group as basic or advanced practice, depending on the difficulty and time-cost of implementation, its dependency on other practices, and if the practice was fundamental to creating an accessible course.

#### *Development of UDL nuggets*

Our goal was to increase engagement of instructors with universal design and accessibility principles. We determined that short, actionable suggestions would be the most likely method to reach busy instructors. We planned to share weekly, action-oriented UDL changes that would be simple and easy to understand by instructors without prior experience of UDL or accessibility. We would also identify, where possible, the most scalable changes and to tie topics together to build upon each other as we introduce them.

#### *Audience Development*

We decided early-on to allow nugget recipients to subscribe and unsubscribe from the weekly nugget communication, which would be in the format of a short email. We speculated that instructors, in particular, would be more likely to open and read our nuggets if they were at the top of their email inbox early in the morning and earlier during the work week. We elected to send nuggets if possible, on Tuesday mornings (because Monday already had too many items calling for attention) during the semester at 6am. We speculated this would be most likely to get attention from instructors but did not attempt to formally measure this decision. Nuggets were not sent during academic break or during final exam weeks when instructors would likely be otherwise distracted from academic work. We speculated that sending no more than one nugget a week would ensure that we would not be too overbearing to recipients and further that it would give us sufficient time to create and refine each one.

Our initial audience were instructors who we had had previous contact with, then we invited our newest set of instructors that participate in a college-wide mentoring program. We encouraged word-of-mouth growth i.e., subscribers to share and to invite other subscribers. We also informed other collaborators, other accessibility, and universal design colleagues, about the nuggets so they were welcome to subscribe. In late January 2024, once we had established a

regular pattern and process of nugget publishing, we submitted an announcement in the campus-wide weekly newsletter to invite others to subscribe to our weekly nuggets.

### *Content Development*

We brainstormed ideas based upon the aforementioned training class content and scheduled topics for weeks. Weekly, student research assistants wrote content based upon the selected topic, our communication coordinator edited the content for action-oriented verbiage, structure, and format, then pushed and scheduled the email through the email system. A guiding principle was to provide useful digestible information at different levels of reader engagement with each weekly nugget. For example, recipients might

- Only read the subject line and never read the email contents.
- Skim read the content of the email, or only the initial portion of it.
- Read the full email but not open any additional content.
- Open links and read more on the topic.
- Continue exploring other UDL and accessibility topics on our website.
- Follow the “Dig Deeper” items and take an extended amount of time to explore the topic.

We determined we wanted to provide short, actionable suggestions. Nuggets were formatted with an easy to identify subject line, “UDL Nugget: <ACTION>”. The message included a single action-oriented sentence for an instructor to change or take in bold font, a short, few sentence, explanation of the impact of taking the action, and then a section for ‘digging deeper’ to understand further impact, research to back up the reasoning for the change, or further changes to consider.

To make the resources more accessible and to retain the content for further reference, we linked these nuggets to our research homepage and archived them in a blog format (i.e. each nugget was also published as a web page). We linked to this page in our nugget messages and have referred to them in a highlighted version of our first few weeks of content.

### *Communication and usage tracking*

The email-based publication system supported generating reports about each nugget sent. Report information included total number of recipients who were sent the nugget email, total opens and whether those opens were on mobile devices or on computers. The reports were generated at least one week after each nugget was sent to see the open counts after each. Detailed reports also identified which links embedded in the nugget were opened by subscribers. Once we published the nugget content to our research homepage, we were also able to track web page visits.

### *Development of the video vignettes, analysis of their transcripts, and ClassTranscribe Tutorial*

We collaborated with the university educational services to create short videos and encourage faculty members to implement UDL principles in their classrooms. We chose a “grass-root” approach to ask various students and faculty members to share their experiences on UDL and why UDL matters to them. Additionally, we gave students the opportunity to share their experiences using the educational material ClassTranscribe, a digital notes platform designed

specifically to incorporate accessibility and UDL [14]. Both students and faculty were chosen for the videos to portray a variety of backgrounds, and each member discussed a different aspect of UDL. Topics included visual accessibility, designing accessible course materials, and students' experiences using ClassTranscribe.

We analyzed the recorded speech from the vignettes audio to identify key topics discussed by students and faculty members regarding UDL for further outreach initiatives. The speech to text software, Whisper, using the large model was used on a local machine with GPU to convert the video into a transcript [18]. Then, we manually analyzed the topics to include key topics.

Alongside the vignettes, we developed and provided a short ClassTranscribe video tutorial to encourage faculty members to adopt ClassTranscribe as an accessible educational material for their classroom. The tutorial walked through the steps an instructor would take to set up a course and create digital notes, and it highlighted key accessibility students that could be beneficial to students. The tutorial highlighted the multi-modality of using digital notes, because students have the option of either viewing a lecture video or reading notes generated from the lecture video.

## Results

### *Canvas training course*

The course was structured with 7 modules on Canvas. The first module included an introduction with the learning goal of understanding the needs of SWD and identifying the common barriers to diverse learning. In this module, we included audio clips from an interview with a focus group of SWDs. This module is subdivided to a general introduction of the needs of SWD students, their experience with Learning Management System (LMS), their experience with course staff and their perspectives on course policy. The second module is about accessibility related laws and regulations. We made a short powerpoint presentation that covered the history, the major laws and regulations, the compliance gap and accessibility testing and some references including publicly available videos for such a topic. Module-3, introduced the 3 principles of the UDL framework, Multiple means of i) Engagement; ii) Representation; iii) Actions & Expression, and linked to literature and studies of each principle. Module-4 listed the basic UDL practices. Module-5 introduced more advanced UDL practices. In Module-6, we included the examples and templates that can be copied or easily edited to be used by the instructors. Lastly, Module-7 provided a large compendium of external resources pages from many institutes and agencies.

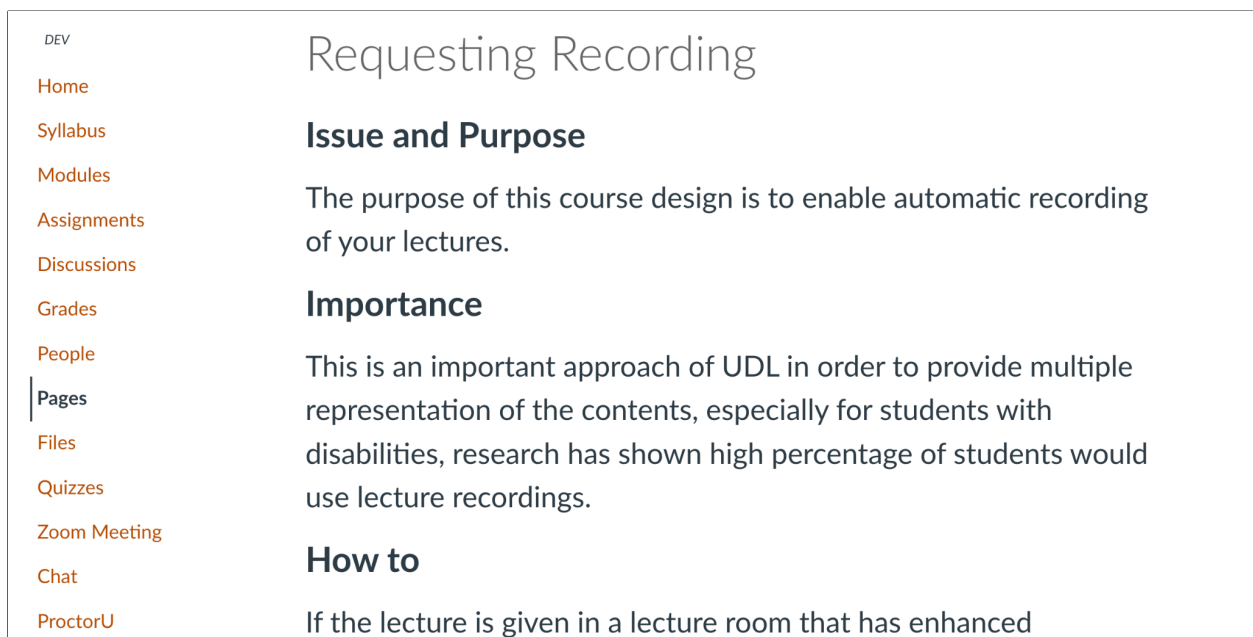
For the library of basic practices, we included the following topics:

*Syllabus on Canvas, Canvas Immersive Reader, Canvas Accessibility Checker, Colors and Fonts, Alternative Text and Explanatory Captions, Email Via Gradebook, Calendar usage, Uploading Slides To Canvas, Request recording, Requesting VideoCaption, Embedding Video/page, Examwrapper, Add Forum to Menu.*

For the advanced level, we selected, *Synchronizing external events to a unified calendar; Converting Latex into a Canvas Page HTML, Exporting a Canvas course as an EPUB,*

*GradedGroupDiscussion On Canvas; Worksheet For FlippedClass; Flexible deadlines; Transforming video content; Canvas Access Report.*

We chose these practices because they are essential elements to make a course accessible and many of them were referenced by UDL principles. The practices such as video transcripts and flexible deadlines have been reported in accessibility studies [16] to be important course design features for college students with and without accessibility needs. Figures 1-3 highlight the course pages for these UDL best practices [16]. Each page summarizes the idea and motivation before presenting the implementation details. We also published this content in the public in the Canvas commons library (see the appendix). As an effort to share these UDL practices, we reached out to the liaison forum of instructional faculty in the university, the University's teaching academy, and gave several lunch and workshop talks on these UDL based course design and pedagogy to the college of Engineering faculty. These talks are also made available to the general public through the university's video platform.



The image shows a screenshot of a Canvas course page. On the left is a navigation menu with the following items: DEV, Home, Syllabus, Modules, Assignments, Discussions, Grades, People, Pages (highlighted with a vertical bar), Files, Quizzes, Zoom Meeting, Chat, and ProctorU. The main content area has the title 'Requesting Recording' and three sections: 'Issue and Purpose' (stating the purpose is to enable automatic recording), 'Importance' (stating it's important for UDL to provide multiple representations), and 'How to' (starting with 'If the lecture is given in a lecture room that has enhanced').

Figure 1. Canvas Course Page about the UDL practice of providing recording of lectures

DEV

Home

Syllabus

Modules

Assignments

Discussions

Grades

People

Pages

Files

Quizzes

Zoom Meeting

Chat

## Requesting VideoCaption

### Issue and Purpose

The purpose of this course design is to make automatic captions/transcripts of the recordings of your lectures.

### Importance

This is an important approach of UDL in order to provide multiple representation of the contents, especially for students with disabilities, research has shown high percentage of SWD students would use lecture transcripts.

### How to

Figure 2. Canvas Course Page that describes the importance of providing transcripts of the lecture videos, another UDL practice.

DEV

Home

Syllabus

Modules

Assignments

Discussions

Grades

People

Pages

Files

Quizzes

Zoom Meeting

Chat

ProctorU

## Flexible deadlines

### Issue and Purpose

The purpose of flexible deadlines is to return agency to students while cutting down on logistical work for course staff, in particular arbitration of requests for deadline extensions. When logistically possible, consider using a flexible deadline structure, especially for auto-graded formative assessments.

### Importance

All students are likely to experience some form of disruption to their learning throughout a semester. These disruptions can range from a mild illness for a couple days, to matters that could require a student's absence from class for over a week.

Figure 3. Canvas Course page that introduces a flexible deadlines practice.

### *UDL Nuggets*

The UDL nugget communication initiative is an ongoing activity. To date we have prioritized and published the following topic emails.

11/7/2023, #1: "Enhance Your Courses with Recorded Lectures/Start Recording Your Lectures"



The first nugget focused upon increased accessibility and inclusive learning, and the variety of additional help a recorded lecture can provide: captions, variable viewing speeds, review, and ability to use screen readers and magnification with recorded material.

This topic was chosen as our first nugget because it is minimal effort on behalf of the instructor but is a high-reward action. Despite the reluctance of professors to record their lectures, research, both in the form of large student surveys [16] and student performance analytics [11] conclusively shows the value of this action for students with and without accessibility needs. While video recordings are not appropriate for all content, our research [16] found that many instructors were unaware of the value of this action.

The Dig Deeper section provided reasons for recording, accessibility, universal benefits for all students, instructions on how to use campus resources to record lectures, tips for success and additional resources and research evidence.

11/14/2023, #2 “Using Captions/Enhance Your Recorded Lectures with Captions”

This second nugget referenced our previous email nugget about recording lectures to suggest use of captions for recordings. The Digging Deeper section pointed to increased accessibility and clarity with the use of captions, reference to empirical studies that captions improve student attention, memory, and comprehension of video content. We pointed to our one research group findings that captions have been a valued course feature from our student responses. We also referenced laws that require captioning for available recordings. Again, we included instructions on how to add captions using campus and publicly available resources, captioning services, and the importance of caption editing for accuracy.

11/28/2023, #3 “Use ClassTranscribe and I-Notes/Use ClassTranscribe for improved video accessibility and I-Notes ”

The third nugget built upon the previous week’s topic to point out a specific video player to provide additional accessibility features for students like magnification, contrast adjustment, descriptions and different caption languages for lecture and class recordings, and a tool to transform class recordings and slides into usable digital textbook as an equivalent learning pathway for student use. The Dig Deeper section provided links to tutorials for how to use ClassTranscribe and I-Notes.

12/05/2023, #4 “Use Flexible Deadlines”

We highlighted how the use of flexible deadlines gives agency to students to adjust their workload for a given class. We noted that most students will experience some disruption within any given semester and how flexibility built into class assessment schedules can reduce the pressure on students and instructors to navigate requests for deadline extensions. The Dig Deeper section provided three flexible methods, along with examples as necessary: move deadlines back, rolling deadlines, and dropped assignments.

01/17/2024, #5 “UDL & Accessibility Highlights from Fall 2023”

For the first week of the spring semester, we highlighted the topics covered over the previous four nuggets: Flexible Deadlines, Recorded Lectures, Use of Captions, and ClassTranscribe and I-Note tools.

01/27/2024, #6 "Survey"

We requested feedback from our subscribers on their experience with the nuggets.

01/28/2024, "Campus Newsletter"

The weekly campus newsletter ran an announcement about our subscription-based UDL nuggets. It highlighted our research project, linked to our subscription sign-up page, and our research website.

01/30/2024, #7 "Use Onboarding Forms to Understand Your Students Needs"

We provided an example of a semester onboarding form that instructors can use to proactively gather information about their students, their needs, and preferences. The Dig Deeper section highlighted ways for such a form to allow students to submit their Letter of Accommodation, but also asked about interests, comfort level with subject material, and other data about workload, assignment timing, and grading methods.

02/02/2024, "Survey"

We again requested feedback from the subscribers, noting that we had a significant increase of subscribers since our last request.

02/06/2024, #8 "Use Accessibility Checkers/Use an Accessibility Checker to Improve Course Accessibility"

We suggested using available accessibility checkers, particularly the one built into the rich text editor of our learning management system (LMS), to make even small changes to improve navigation of educational content and effective learning for all students. We also shared a variety of other accessibility resources for our campus LMS. In our dig deeper section, we suggested instructors encourage students to utilize the accessibility checker for their discussion board posts to take an active responsibility for accessibility in their learning community.

02/13/2024, #9 "Use More Than Color to Highlight or Differentiate Pieces of Information"

We recommended best practices to use text treatments, lines, patterns, and icons to reinforce importance rather than the use of color to solely communicate information. We introduced the idea of alternative text and descriptive text for graphs, images, and digital dashboards in the Dig Deeper section. And we introduced a few tools for testing color contrast when color is used. We also suggested tools for student use to control color contrast and suggested encouraging student use of color checkers for their own content creation.

02/20/2024, #10 "Know About Assistive Technologies/Know and Share About Assistive Technology for Students and Faculty"

We defined accessibility tools and gave examples. In the Dig Deeper section, we urged instructors to encourage students to use our school's Disability Resources and Educational

Services (DRES) accessibility tool resources, we suggested instructors do their own exploration of these tools. We provided a contact at DRES for further questions about specific tools, we linked to their 'Try It Out' webpage and included a link to policy pages.

02/27/2024, #11 "Accessibility Round-Up/Stay in Tune with Accessibility Needs of Your Students"

This nugget was a summary of accessibility topics: keep learning about tools, build your accessibility toolkit (including an invite to a co-hosted workshop), use the accessibility checkers in Canvas, use non-color techniques to organize and highlight information, and encouragement to keep up to date on accessibility tools available on campus

03/05/2024, #12 "Learn About the Foundations of Universal Design for Learning (UDL)"

We introduced the three pillars of UDL including a brief history and four fun facts. In the Dig Deeper section, we presented about the theory, best practices, and tools of UDL. We included a plethora of links: 20 Accessibility Tips, lecture-related software, UDL Guide from Yale, Interactive Module on UDL from Vanderbilt University, Cornell UDL resources, links to the latest research, an encouragement to hear from practitioners and join available UDL communities (CITL, UDL Team, UDL Podcast, Canvas Commons).

03/19/2024, "Join Us for Canvas Accessibility Training, Dedicate Time to Learn About Accessibility in Canvas"

This message contained a welcome back from spring break and an invitation for a co-hosted workshop on accessibility tools built into Canvas.

03/26/2024, #13 "Course Organization - Syllabus/Organize your course with an effective syllabus"

We covered topics of syllabus formatting, the use of inline topic links, and the use of multiple pages if hosting the syllabus in an LMS. We included fun facts about syllabus use and history. The Dig Deeper section highlighted the available supports for our school: DRES resources and guidelines and the student counseling center. We also included research information about syllabi and examples.

04/02/2024, #14 "Use a Course Calendar and Scheduler"

We provided a short discussion of what information should be included on a course calendar: due dates, deadlines, and progress in course content. We encouraged the use of the LMS built in calendar, explicit about deadlines and important dates, calendar feed to export to google calendar to provide students an alternative way to manage courses, be sure to include course staff office hours, fun facts, research on calendar tools, links to canvas and google calendar guides

04/09/2024, #15 "Course Organization - Tools and Resources/Use Tools, Built-In Features, and Share Resources to Keep Your Students Informed and Engaged"

We highlighted methods and tool types that enhance learning, provide multiple pathways to knowledge, and gave a long list of available tools available to our instructors and students.

Tools included online discussion forums, remote meetings, multiple ways of engagement, video platforms, assessment tools, roster management tools, appointment tools, and survey tools. The Dig Deeper section provided a non-exhaustive list of links to examples of each type of tool and links to relevant support documentation.

### Reach

Our first 6 nuggets had a small number of subscribers (approximately 30, including some research project members whose clicks were excluded in the rest of the data analysis). There was a steady increase during the fall semester due to word-of-mouth sharing by the subscribers. On January 28, 2024, we published an announcement in the campus weekly newsletter. This created a significant increase in subscribers; the subscriber counts more than doubled in a week due to that single invitation. University policy prohibits multiple announcements in weekly campus newsletter within the same semester, but we intend to run another invitation in future semesters.

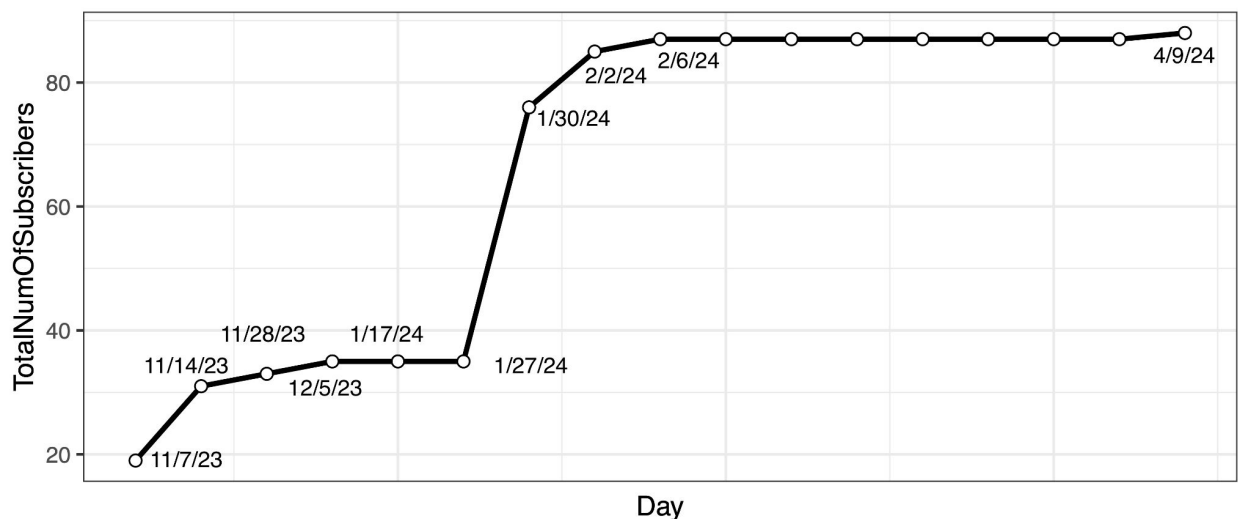


Figure 4 The number of email nugget subscribers over time

The overall number of nuggets opened has increased as our subscriber count increased. There was a consistent open-rate of approximately 60%, both before and after the increase in subscribers. There was an increase in clicks as more nuggets were sent, with the exception near the end of the fall semester.

The emailed nuggets include links to our website. The website had a landing page for each nugget which contained more information about accessibility tools and practices for each nugget topic. The access logs of our website showed visits increased after nuggets were emailed. Figure 5 shows the total number visits to the website and the total number of visits to the nugget page over time. The dotted lines indicate a nugget was issued. In general, spikes of engagement occurred on the day of or a few days after a nugget's release. Figure 6 demonstrates that there was a growing trend in unique email opens to total emails sent,

particularly over the course of the end of the Fall 2023 semester and the start of the Spring 2024 semester, gathering a consistent number of readers during the Spring 2024 semester.

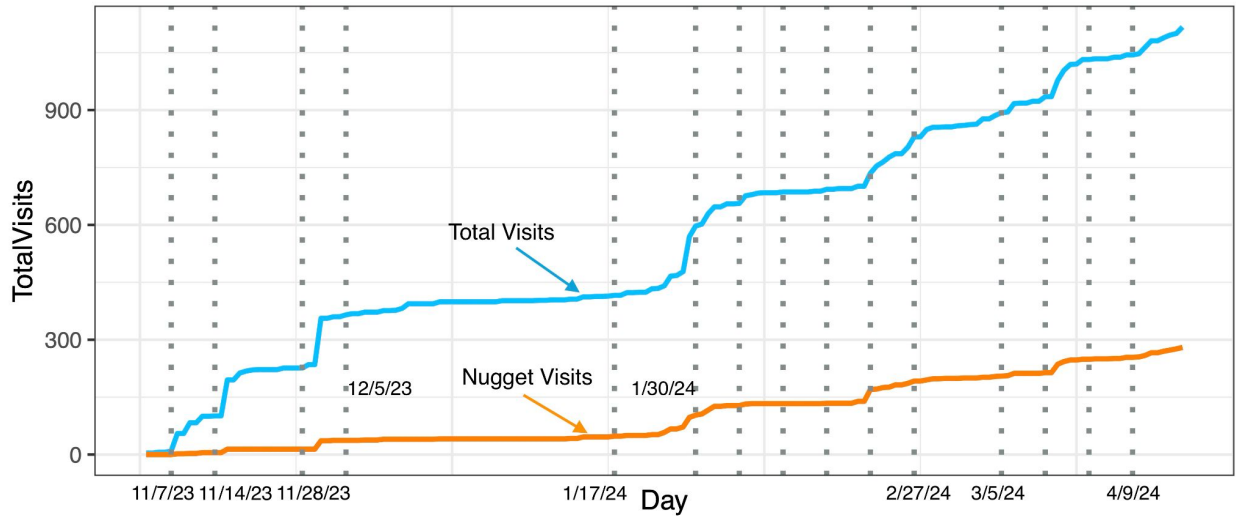


Figure 5. The number of visits to the website and nugget page over time.

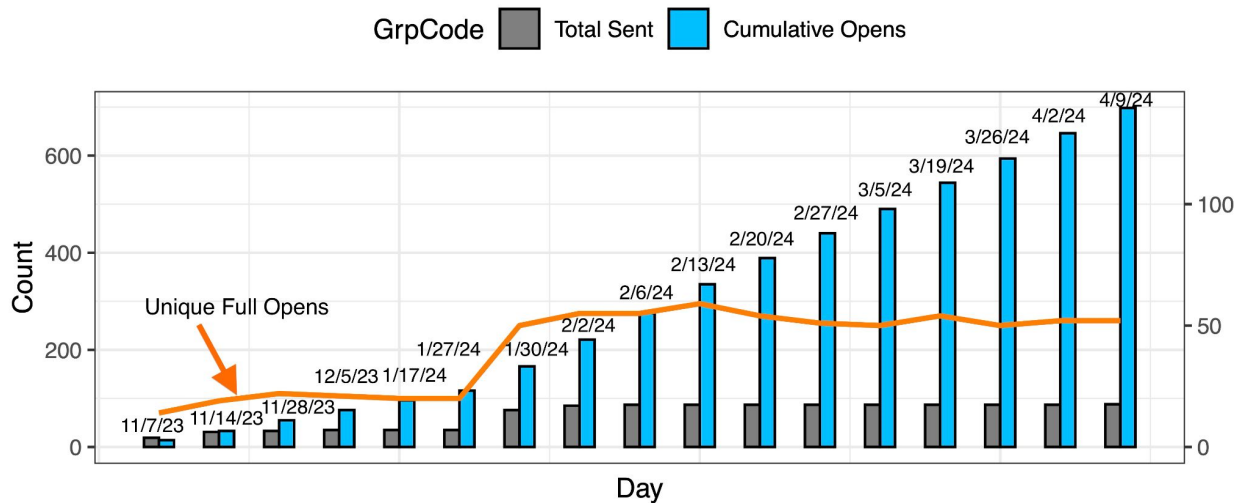


Figure 6. The number of messages sent out, the number of cumulative opens and the unique number of full opens over time. The unique number of opens uses the right vertical axis.

The open-rate percentage fluctuated (Fig. 7) but remained above 50% for all nuggets, spanning a range of 57.14% to 73.68%. The average across all nuggets was 62% (survey requests had a similar open rate). Most of the open activity occurred within the first three days after each nugget was sent.

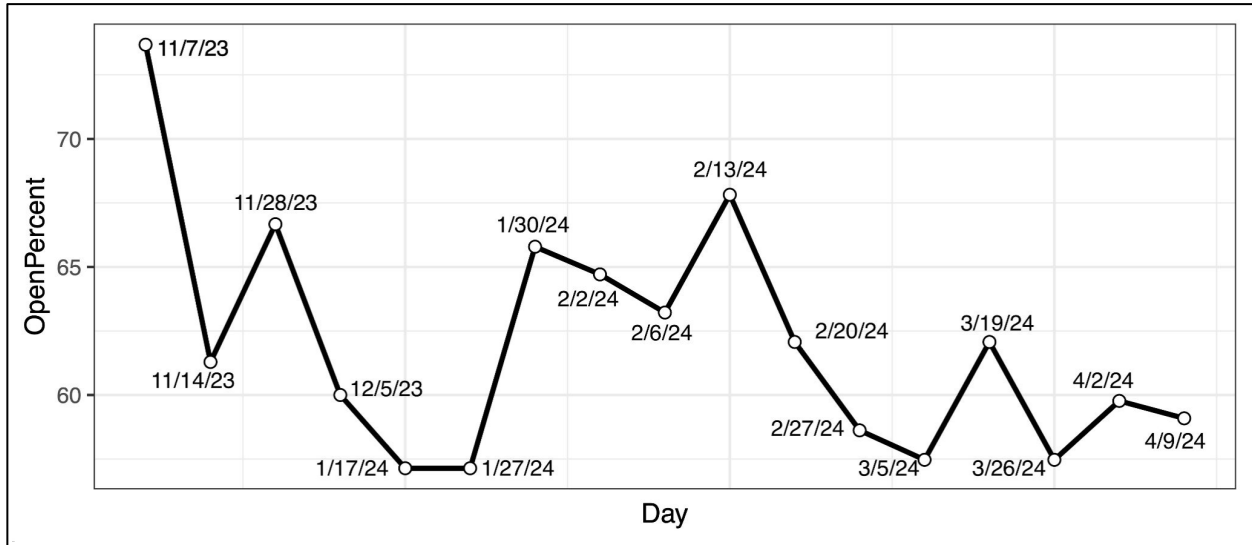


Figure 7. The percentage of messages opened over time.

We explored which links subscribers clicked upon and how frequently they used links to dig deeper.

The number of clicks per nugget is presented in Fig. 8. The number of clicks per nugget averaged over 9 clicks, but we saw that is greatly influenced by the spike in clicks after our significant subscriber increase in late January.

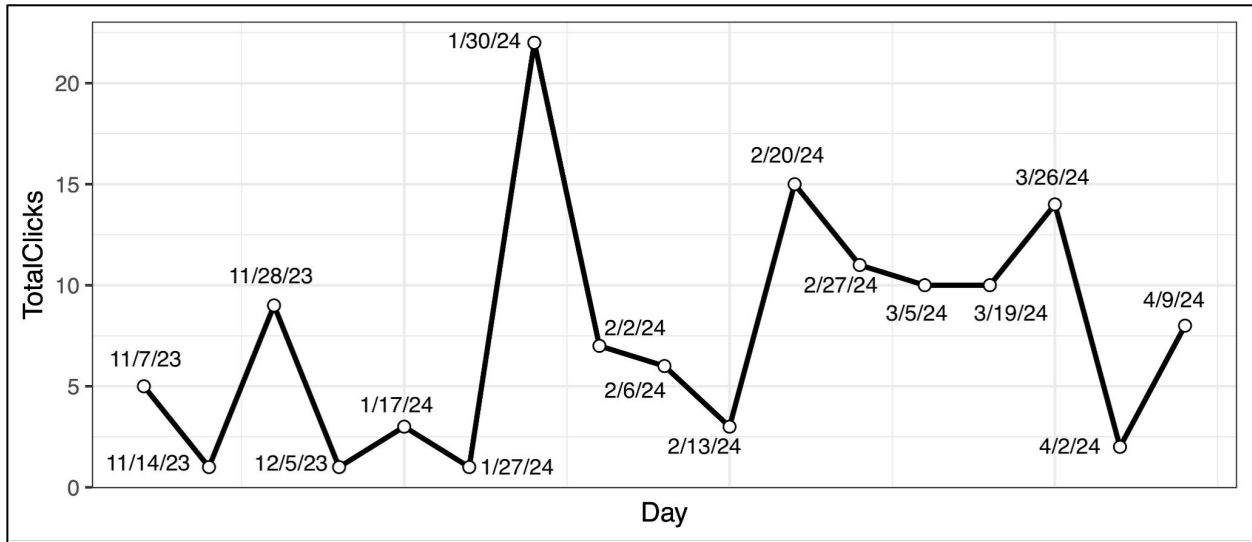


Figure 8. The number of clicks per nugget over time.

There were 60 unique visitors to our site who clicked at least one link in a nugget. Further, web readers tended to explore other accessibility topics once at our website. There were at least 39 visitors, unassociated with the research team, who continued to explore additional UDL and accessibility topics after a nugget's landing web page (see Table 1).

Number of web pages visited	Number of visitors
1	21
2-4	15
5-8	17
9-14	6
>14	1

Table 1. Number of web pages loaded by each unique visitor of our website

In the next part of this paper, we examine our video vignettes. Ultimately, they will be used to motivate other faculty. In this paper we look at the main themes that students and faculty presented.

*Video vignette themes*

The video vignettes were short (< 5minute) “head shot” videos of a single person (either a student or instructor who discussed their personal thoughts on the importance of UDL or accessibility ideas in their own educational experiences and/or course design. The video vignettes covered a variety of topics, but the key themes that both students and teachers discussed are listed in Table 2. Out of the 11 people participating in the vignettes, most discussed how accessibility is important for learning and how providing lecture recordings or slides is beneficial for students. Additionally, many individuals shared their personal experiences while discussing UDL.

Key themes	Number of people
Accessibility is important for learning	8
Personal anecdotes	7
Providing lecture recordings/slides is helpful	7
Students access material in different ways	5
Small changes can significantly help with accessibility	5
We should try to approach as many students as possible	5
Accessibility helps students learn	5
Students use materials in different ways	5

Table 2. Video vignette themes and ranked by number of people who touched on that theme

## **Conclusion**

To promote the adoption of UDL-based and accessibility best practices and foster the development of instructors' interest and awareness of accessible course design and delivery, we used a three-fold approach to reach and support the instructor in our school. First, we developed a Canvas training course that includes comprehensive topics and a large library of UDL best practices at different levels. We also developed examples and templates that can be easily shared to other users and plugged-in other courses on Canvas. These contents can be updated easily and improved by multiple owners. Second, we tried to utilize an email nugget approach to generate interest and sustain the interests of instructors on these UDL best practices and found that they did reach up to 70+ subscribers. To date, the "Use More Than Color to Highlight or Differentiate Pieces of Information" nugget from February 13, 2024 had the highest engagement with 59 opens and a 67.82% open rate. These users also visited the dig-deeper messages where they showed more in-depth interest. A wide-spread email newsletter at the system level significantly increased the number of subscribers. Third, we generated video tutorials and vignettes that share testimonies, stories, or inspiring information as a new format to reach out to the community. The video vignettes were generated with a grass root approach, and we analyzed the transcripts from the participants to find the topics that people covered.

## **Discussion**

It's been increasingly important for educators to engage students in the post pandemic time via UDL approaches. While we endeavored to reach out to more instructors for the adoption of UDL practices, we opted to use multiple pathways to generate interests in college faculty who are having tight time constraints. The idea of using short email nuggets that were generated using content from an underlying comprehensive training course is reaching a large number of faculty. Further analysis has shown a large number of faculty are engaging with the nugget content and approximately 60% of the recipients who read a nugget also choose to open web links and learn additional content. Interest in, and success of, the nugget approach exceeded the a priori expectations of this research group. By archiving the nuggets as web pages, we could amplify efforts and repeat nuggets communications at different institutions, or to new faculty in 12 months' time.

We also used a grassroots approach to foster the education environment by creating video vignettes that talk about themes related to UDL and personal stories for a holistic experience on campus. This is still a nascent effort, but it is encouraging to see students and faculty share their personal interest and enthusiasm for UDL and accessible approach to education. In the future, this research group will be able to use the video vignettes to further motivate adoption of UDL and accessible approaches by new faculty.

According to Hidi et al [17] in their work on Four-Phase Model of Interest Development, when a person reaches the phase of emerging individual interests (the 3rd phase), they typically possess characteristics such as positive feelings, stored knowledge, and stored values. We're encouraged that the number of subscribers of our UDL nuggets increases over time, and they



do respond to the knowledge sharing and advertisement which suggest emerging personal interest. As to the dramatic drop in open-rate in December through January is likely due to the increased demand upon instructor's attention at the end and beginning of semesters. We are eager to see what open rates we will see with a much larger audience after our January increase in subscribers. We will also be watching if the open-rate reflects the fluctuating demands on instructors' time throughout the year.

It has been reported previously that the lack of time and lack of awareness were among the top barriers for college instructors to implement UDL practices. In our project we again face the difficulties of reaching out to instructors through personal contact or meetings. In addition, it has been challenging to get feedback from the instructors as well, for example, the survey response rate was very low after we sent recipients two requests for feedback. Due to the pressure of a busy schedule, instructors rarely have a large chunk of time to invest in a comprehensive training course. For this reason, even if we designed the training course on Canvas, we didn't plan to use it as a formal training course rather as a resource and management system. The advantage of such a course is that instructors can add their examples or templates to support the plug-and-play experience for their peers.

Training materials are a necessary part of our outreach efforts. As UDL promoters, we practice the multiple representation principle in our project as well. With our technology of producing multiple media/formats of contents, we paid extra attention to make our materials more accessible. One advantage of our video tutorial is we are able to produce the alternative book format of the video automatically via our video software platform and we envision we can generate the alternative format for the other engaging video vignettes. The limitation of such work with video is it takes a significant amount of time and manpower to create high quality videos.

### **Future work**

As we mentioned, we used multiple ways to engage faculty instructors for the adoption of UDL best practices; what we have tried might be only a small percentage of many potential methods. In the future, we could provide online office hours, organize workshops or casual brown bag lunch meetings for instructors to discuss and learn by hand-on experience. We will also reach out to more staff and administrators for support, especially at the system level. As one can see from our data, one system level email advertisement helps generate a large portion of new subscribers of our nuggets. We will continue to work on the video vignettes and find creative ways to use them to generate more interest in UDL practices. We're also looking forward to sharing our knowledge and material with the wider community of educators. Finally, to provide case studies on the impact of nuggets and other provided resources, we will follow up with subscribers on any adoption of UDL practices introduced by nuggets or our other resources.

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## Appendix

Examples of the nugget communications, links to our websites, and other content examples can be found through the links provided in Table 3 below.

Resource	Link
Research Group Webpage	<a href="https://publish.illinois.edu/udl-accessibility-group/">https://publish.illinois.edu/udl-accessibility-group/</a>
Nuggets Landing Page	<a href="https://publish.illinois.edu/udl-accessibility-group/nuggets/">https://publish.illinois.edu/udl-accessibility-group/nuggets/</a>
Sample Onboarding Form	<a href="https://docs.google.com/forms/d/1wdP1Tmac6sFAIH7fuxitxPS7x9_GkC16GV2UcwYQfq8">https://docs.google.com/forms/d/1wdP1Tmac6sFAIH7fuxitxPS7x9_GkC16GV2UcwYQfq8</a>

ClassTranscribe	<a href="https://classtranscribe.illinois.edu/">https://classtranscribe.illinois.edu/</a>
Canvas Training Course Module1	<a href="https://lor.instructure.com/resources/6737105c6cad43779230207222761456?shared">https://lor.instructure.com/resources/6737105c6cad43779230207222761456?shared</a>
Canvas Training Course Module2	<a href="https://lor.instructure.com/resources/f0217a5dafeb4291881fe82eb58f1224?shared">https://lor.instructure.com/resources/f0217a5dafeb4291881fe82eb58f1224?shared</a>
Canvas Training Course Module4	<a href="https://lor.instructure.com/resources/8e3dda21692d411199d055b7373eb795?shared">https://lor.instructure.com/resources/8e3dda21692d411199d055b7373eb795?shared</a>
Canvas Training Course Module5	<a href="https://lor.instructure.com/resources/9ffa7c78280d477caf81e1ca7c2d32d7?shared">https://lor.instructure.com/resources/9ffa7c78280d477caf81e1ca7c2d32d7?shared</a>
Canvas Training Course Module6	<a href="https://lor.instructure.com/resources/32b280da10ba4d9dae5e1b057f83c168?shared">https://lor.instructure.com/resources/32b280da10ba4d9dae5e1b057f83c168?shared</a>

Table 3. Links to resources mentioned in this paper