Learning Design Analysis of the Technology Supported Learning Environment of EDRS 810 Educational Research Methods in Canvas, a Learning Management System

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In this study we examined a course hosted on the Canvas Learning Management System (LMS), a platform developed by Infrastructure. The course was EDRS 810: Education Research Methods and was offered in a traditional setting. Canvas is a digital learning platform that supports various educational settings, including K-12 schools, higher education institutions, and professional learning environments (Canvas, n.d.). Founded in 2011, Canvas is the world's top education software and is used by over 6 million students worldwide.

TSLE Overview

The EDRS 810: Education Research Methods is taught at George Mason University. Geared towards doctoral students, this advanced course equips students with the skills to expertly interpret and apply educational research methods. It provides an in-depth comparison of various research philosophies, empowering participants to formulate precise questions and hypotheses while developing strong research plans and analysis procedures. Students engage in critical evaluations of existing studies and explore a diverse array of research approaches. This course is proudly presented by the School of Education and held weekly in person on Thursday evenings.

With a user-friendly interface, the Canvas LMS hosted this course and has a wide array of tools to streamline communication, course management, and student engagement. Instructors may structure the content delivery by organizing content into modules and choosing to add resources, assignments, quizzes, and external tools (Canvas, n.d.). Furthermore, the instructor may include assessments with integrated assignments and quizzes; provide text, audio, or video feedback, and enable options such as announcements, messaging, discussion boards, and integrations with external collaboration software such as Lucid or Zoom. Canvas also includes

analytic functionality for the instructor to monitor student engagement, activity, and progress. The platform considers and encourages accessibility with features like screen reader compatibility, third-party tool integrations, and remote access through the mobile app. These capabilities make Canvas an adaptable tool suitable for different educational contexts.

The Assessment

Focusing on a doctoral-level course, our examination and evaluation of EDRS 810: Education Research Methods hosted in Canvas LMS was conducted in November and December of 2024 at George Mason University. We utilized a Likert scale to evaluate the co-created Technology Supported Learning Environments (TSLEs) scale. The scale measures the demands placed on human learning and cognition while using the Canvas LMS. After each researcher independently evaluated the TSLEs utilizing a 5-point Likert scale, we triangulated the results to ensure consistency and reliability in our analysis.

TSLE Technology

Overview of the Design Features

Canvas, a widely used LMS, supports TSLEs by providing a flexible and user-friendly platform for course delivery and management. Its core features include course content organization, customizable modules, integrated multimedia tools, collaborative spaces, and robust assessment functionalities. The platform supports synchronous and asynchronous interactions through integrated communication tools like discussion boards, messaging, and video conferencing. Canvas also seamlessly integrates third-party tools and learning analytics to track and enhance learner performance.

Technology Classification Frameworks

Using the Kitsantas and Dabbagh (2010) framework, Canvas can be classified as a learner-centered system that supports self-regulated learning by offering an array of tools designed to promote goal setting, progress monitoring, and reflective practices. For instance, task-oriented modules and customizable dashboard features enable learners to establish clear objectives and track their achievements efficiently. The inclusion of reflective journals, self-assessment tools, and progress indicators further underscores its alignment with principles of self-regulated learning.

Similarly, Dabbagh et al. (2019) categorize Canvas within the broader spectrum of network-based tools, emphasizing its capacity to facilitate collaborative and socially engaged learning experiences. Tools such as group workspaces, peer-review functionalities, and integrated discussion forums foster dynamic interaction and collective knowledge building. The availability of synchronous tools, such as video conferencing, alongside asynchronous options like discussion boards and multimedia submissions, enables a rich, multifaceted approach to communication and learning.

Together, these frameworks position Canvas as a robust technology that bridges content delivery, learner engagement, and personalized pathways. It supports diverse educational needs, ranging from individual self-paced study to community-driven, collaborative projects, making it a flexible and adaptive platform in modern education.

Individual and Team Observations

The Process

As members of the class since August 31, 2024, each team member had 24-hour access to the TSLE in Canvas and engaged multiple times throughout the course before evaluating its

elements for this report. For this study, each member acted as an observer from November 1st through December 10th, 2024, accessed the TSLE an average of three times each week, and spent approximately two hours per session engaging with the TSLE. In addition to observing, we actively participated in the course activities, interacting with the instructor and other students. We had access to all course materials, announcements, discussion boards, and assignment submissions. Our roles as participants allowed us to experience and evaluate the TSLE from a first-hand perspective, providing a deeper understanding of how its features supported teaching and learning. This dual role enriched our evaluation process, as we could observe and document the TSLE while actively engaging in its functions.

Individual Observations

To evaluate the Canvas LMS, we developed a Google Form using a Likert-scale format, where each item was rated on a scale from 1 (Strongly Disagree) to 4 (Strongly Agree). Each team member independently completed the form, providing their ratings and optional written notes explaining their reasoning. To support their ratings visually, members took screenshots from the Canvas LMS as evidence to demonstrate the presence of the specific TSLE item being evaluated. The responses were collected in the Google Form and automatically stored in a linked Google Sheets file for easy access and organization. This allowed the team to individually review and analyze the data and collaboratively review and analyze the data, identify trends, and discuss areas of agreement or divergence. These discussions, informed by the collected data, notes, and visual evidence, were used to reflect on and refine the TSLE scale to better align with the team's objectives. In the following individual narratives, the score for each criterion is annotated. The scoring key is as follows: 4 = found abundance of evidence, 3 = easily found evidence, 2 = found minimal evidence, and 1 = found no evidence.

User 1: Zee

1.0 Usability. Zee found Canvas highly user-friendly, scoring it consistently high across the usability criteria. Specifically, the platform scored a **4** due to its ability to facilitate access across systems, devices, and browsers ensuring seamless interaction regardless of the learner's technology setup. Its intuitive interface simplifies navigation and scored a **4**, making it accessible to users with varying levels of technical proficiency. Canvas's use of multimedia applications, such as video, voice, and text integration **4**, was slightly lower, as Zee noted room for improvement in fully leveraging these features for a more immersive experience.

2.0 Feedback. In the feedback category, Zee observed that Canvas excelled in providing personalized and automated feedback 3, which supports self-regulated learning. The peer-to-peer feedback feature scored a **4** because it was effective but could benefit from additional tools to streamline collaboration. The structured feedback options for educators scored a **4** and were noted as a robust feature that empowers instructors to offer meaningful guidance tailored to individual learners' needs.

3.0 Scaffolding. Zee recognized Canvas's efforts to provide step-by-step guidance tailored to skill levels but scored it a **3**. This is evident in the platform's modular design and guided learning pathways. However, the self-assessment opportunities scored a **2** because they appeared underdeveloped, with limited options for learners to independently evaluate their progress. Tools for solving complex problems scored a **4** and were praised for fostering critical thinking and offering resources that cater to advanced learning scenarios.

4.0 Accessibility. Canvas performed well in accessibility, with Zee appreciating its diverse engagement methods and learning expression opportunities and scoring it a **4**. The ability to control media was scored a **1** and was rated lower due to its somewhat rigid interface, which

could limit learner autonomy. Zee observed that the platform effectively reduces cognitive load and scored it a **4** due to its ability to organize information clearly and minimize unnecessary complexity.

5.0 Social Interaction. Zee highlighted the collaborative learning experiences facilitated by Canvas and scored it a **3** because it encourages peer interaction and teamwork. The asynchronous communication tools were scored a **4** and were rated positively, though there was room to enhance these features to make them more dynamic. Synchronous tools for real-time collaboration were scored a **1** and were deemed underutilized, as Zee noted a lack of advanced functionalities in this area.

User: Cheryl

1.0 Usability. Cheryl confidently assessed the system's usability across various operating systems and achieved an impressive perfect score. She rated the accessibility of the operating system a solid 4, noting that Canvas works flawlessly in both Apple's Safari and Google Chrome on her personal devices, including her iPhone, iPad, and Apple laptop. Cheryl found the interface to be very user-friendly and awarded it a 4. She observed that the left side of the interface effectively incorporates icons, labels, and a navigation bar, engaging users with the course content. Meanwhile, the right side is thoughtfully designed, allowing easy access to optional resources like "To Do" and "Recent Feedback," while the center focuses on the chosen course page. Finally, Cheryl rated the variety of applications a 4, enjoying the flexibility to submit her responses to discussion posts in different formats, such as text, video, or voice recording.

2.0 Feedback. Cheryl rated the feedback system a **3** because it offers instant feedback on errors. However, she pointed out that the feedback options lack personalization and there aren't many features that promote collaborative learning. For peer-to-peer feedback, Cheryl gave a

score of **4** and found it user-friendly and appreciated the ability to view peer comments and provide input on posts to facilitate collaboration. She also mentioned that Lucid chart enhances group collaboration while the discussion board allows both peer and instructor feedback. Finally, Cheryl rated the ability to provide customized feedback a **4** since the instructor's comments were tailored to her discussion video.

3.0 Scaffolding. Cheryl rated the tailored prompts and step-by-step guidance a 4 and noted that clear instructions were provided for assignments beyond the discussion posts, as well as at the beginning of each discussion board on how to complete the tasks. However, she expressed disappointment with the limited self-assessment opportunities available for evaluating her learning and only rated it a 1, along with the options for review or refresher content for areas she missed. Additionally, Cheryl found the tools designed to assist learners in tackling complex problems—such as hints, models, examples, or templates—lacking, which led her to give that a score of 1 as well.

4.0 Accessibility. Cheryl rated the options for engaging with, representing, and expressing learning a solid 4. She appreciated the various submission formats available for our discussion boards, including text, video, and voice recordings, which allowed us to effectively convey our understanding of the assigned readings. In terms of media controls, she also awarded a score of 4. She noted that the videos provided essential features like playback control, the option to toggle closed captions on or off, and volume adjustment. Similarly, the attachments allowed for zooming in or out, expanding to full screen, and starting from the beginning of the content. Furthermore, Cheryl scored the system's ability to reduce cognitive load at a 4. This was due to its clear labeling, generous use of white space, removal of unnecessary text and visual elements, and a consistent hierarchy and navigation design.

5.0 Social Interaction. Cheryl rated the collaborative learning experiences, including group projects and peer discussions, a score of 3, as these were the only options she could find for collaboration outside of Lucid Chart. She also gave the asynchronous communication tools—such as messages, forums, blogs, and recorded videos for flexible interactions—a score of **3**, since the only embedded option available to her was email. In contrast, she found the synchronous tools, like live chats, video conferencing, and shared screen features for real-time collaboration, to be quite disappointing, rating them a **1** because she did not discover any available embedded options.

User: Rachel

1.0 Usability. Rachel provided high usability ratings for the TSLE, highlighting its strong performance across key areas. She rated its accessibility across platforms and devices a **4**, noting that the TSLE was seamlessly accessible on different operating systems (PC and Mac), devices (Surface Pro, Apple Mac, and phone), and web browsers (Chrome, Safari, Firefox). Additionally, she awarded the full **4** points for the platform's intuitive interface, emphasizing its user-friendly and easy-to-navigate design. Lastly, the TSLE scored another **4** for its versatility in supporting various applications, including video, voice, and text, allowing students to share their ideas through their preferred medium. These high ratings underscore the TSLE's accessibility, usability, and adaptability in facilitating diverse learning experiences.

2.0 Feedback. Rachel provided mixed ratings for the feedback capabilities of the TSLE. For the platform's ability to provide instant, automated, and personalized feedback, she rated it a **2**, noting that while basic notifications like assignment submissions or post confirmations are instant, the platform does not offer immediate or automated specialized feedback. For focusing on enabling peer-to-peer feedback through collaborative tools such as shared documents, forums,

or group assessments, Rachel gave a **3**, indicating that while some functionality exists, there is room for improvement in fostering robust peer collaboration. Finally, assessesing the TSLE's ability to allow educators to provide structured, custom feedback on learner submissions, Rachel rated it a **4**, highlighting its strong support for personalized and detailed educator feedback. These ratings reflect a mix of strengths and limitations in the TSLE's feedback systems.

3.0 Scaffolding. Rachel provided moderate to low ratings for the scaffolding features of the TSLE. For the platform's ability to provide step-by-step guidance or prompts tailored to learners' skill levels, she rated it a **3**, acknowledging some support but noting room for improvement in this area. For assessing self-assessment opportunities and the availability of review or refresher content for missed items, Rachel rated it a **1**, indicating significant limitations in these features. Lastly, for focusing on the availability of tools like hints, models, examples, or templates to aid learners in solving complex problems, she rated it a **2**, suggesting minimal but insufficient support in this area. These scores point to notable gaps in the TSLE's scaffolding capabilities, particularly in fostering self-assessment and providing comprehensive problem-solving aids.

4.0 Accessibility. Rachel provided varied ratings for the accessibility features of the TSLE. For evaluating the platform's ability to offer multiple ways for learners to engage, represent, and express learning, she rated it a **3**, indicating some versatility but with room for greater inclusivity. For assessing media control, such as video playback, captioning, and volume adjustments, Rachel rated it a **2**, reflecting limited functionality in this area. However, for focusing on reducing cognitive load through clear labeling, ample white space, minimal unnecessary elements, and a consistent hierarchy and navigation design, she gave it a **4**, highlighting the platform's strong performance in simplifying the user experience. These ratings

suggest that while the TSLE excels in reducing cognitive load, its media control features and adaptability for diverse learning preferences could be improved.

5.0 Social Interaction. Rachel provided moderate to high ratings for the social interaction features of the TSLE. For evaluating the platform's facilitation of collaborative learning experiences through group projects and peer discussions, she rated it a **3**, noting that shared PowerPoints and opportunities for group work within each module support collaboration, albeit primarily in-class. Assessing the availability of asynchronous communication channels such as messages, forums, blogs, and recorded videos for flexible interactions, Rachel gave a **4**, highlighting the platform's strong support for asynchronous communication. Lastly, for focusing on synchronous tools like live chats, video conferencing, and screen sharing for real-time collaboration, she rated it a **3**, indicating adequate but not exceptional functionality. These scores reflect a platform that offers solid support for both asynchronous and synchronous social interactions but could further enhance collaborative learning experiences.

Team Observations

As a team, we observed that the TSLE performed exceptionally well in usability, achieving a perfect score of 100% across all criteria, reflecting seamless access, intuitive design, and diverse application support. Feedback was another strength at 86%, with structured educator feedback and peer-to-peer mechanisms standing out, though instant and automated feedback received moderate ratings. Scaffolding showed mixed results at 58%, with limited self-assessment opportunities and varied support for tools addressing complex problem-solving. Accessibility scored highly at 83%, particularly for reducing cognitive load and offering multiple engagement options, though customization of media control was less prominent. Social interaction had an average score of 69% which demonstrated strong support for collaborative and

asynchronous tools, but the limited functionality and use of synchronous tools highlighted a key area for improvement. These collective observations highlight a well-designed platform with clear strengths and opportunities for targeted enhancements.

Table 1

TSLE Score Overview

Condition	Percentage	Score
Usability	100%	36 / 36
Feedback	86%	31 / 36
Scaffolding	58%	21 / 36
Accessibility	83%	30 / 36
Social Interaction	69%	36 / 36

Note 1: There were three observers for this study: O1, O2, O3

Note 2: Each condition had a total of 12 points available from each observer: 12 + 12 + 12 = 36

Note 3: Percentages are calculated by taking the sum of the points awarded by all observers divided by the total possible points available. (O1 + O2 + O3) / Total Points Available

Expectations and Assumptions

Initially, it was assumed that the Canva LMS would fully incorporate all scale items, providing comprehensive support across accessibility, feedback, scaffolding, and social interaction. This expectation included seamless functionality, robust media controls, personalized feedback, and dynamic collaboration tools. However, this was not the case, as the platform demonstrated gaps in areas such as self-assessment opportunities, automated feedback, and comprehensive scaffolding tools.

Technology Supported Learning Environment Scale

The purpose of the TSLE scale is to serve as a measurement instrument to assess how effectively a learning environment utilizes technology to improve student learning (Chang et al., 2015). The scale below comprehensively evaluates five essential factors: usability, feedback, scaffolding, accessibility, and social interaction. By identifying areas needing enhancement, this scale enables an opportunity to refine the learning experience and increase the effectiveness of technology in fostering student success.

A Likert scale was used to rate the observations. This rating system is widely used to assess attitudes, opinions, and perceptions. It was selected because it is adaptable, flexible, provides insights, easy to understand, and easy to analyze ("What is a likert scale?", n.d.). The scoring key is the following: 1 Strongly Disagree = Found no evidence, 2 Disagree = Found minimal evidence, 3 Agree = Easily found evidence, and 4 Strongly Agree = Found an abundance of evidence.

Figure 1

Observer Form Scoring Key for the Likert Scale

Strongly Disagree = 1	Found no evidence
Disagree = 2	Found minimal evidence
Agree = 3	Easily found evidence
Strongly Agree = 4	Found an abundance of evidence

The conditions included within this TSLE Scale are usability, feedback, scaffolding, accessibility, and social interaction. Each condition construct was operationalized and has been listed below:

- **usability:** the "fulfillment of functional requirements… performance and well-being, mainly from the user's perspective" (Iwarsson & Stahl, 2003, p. 60). It is further defined as the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specified context of use (Grassi et al., 2017).
- **feedback:** meaningful insights for learners about their progress, helping refine learning strategies and improve outcomes. Technology facilitates this process by offering instant, personalized feedback and enabling peer-to-peer and instructor-to-learner communication (Hattie & Timperley, 2007; Allen, 2016).
- **scaffolding:** provides learners temporary support to accomplish tasks they cannot yet complete independently, using step-by-step guidance or adaptive technologies. This support decreases as learners gain competence, fostering independence (Wood, Bruner, & Ross, 1976; Rambe, 2012).
- **accessibility:** a measurement of a user's ability to use products/services, the extent to and ease with which they can meet their goals. Designing with accessibility in mind enables people with various abilities and disabilities to perceive, understand, navigate, interact with, and contribute to the web (UX Magazine, 2020). In Learning Technology, accessibility involves features like text-to-speech or closed captioning to accommodate diverse learners (Seale, 2014).
- **social interaction:** involves creating spaces for communication, collaboration, and knowledge-sharing among instructors and peers. It fosters active engagement, community building, and collective learning through synchronous and asynchronous methods (Koh, 2015).

The Results

Individual Responses and Team Responses

Individual Responses

Rachel. Rachel consistently rated the usability features at the highest level, with a score of 100%, emphasizing seamless access, an intuitive interface, and diverse applications. Feedback was moderately rated at 75%, with lower scores for instant feedback but higher for peer-to-peer and educator-provided feedback. Scaffolding was a mixed area with a score of 50%, with limited self-assessment and problem-solving tools noted. Accessibility scored well at 75%, particularly for reducing cognitive load, though media control was less emphasized. Social interaction was also strong with a score of 83%, with collaboration and asynchronous tools rated higher than synchronous ones.

Cheryl. Cheryl provided high scores for usability at 100% and feedback at 92%, particularly appreciating peer-to-peer and structured educator feedback. Scaffolding was rated evenly across categories with a score of 50%, reflecting room for improvement in self-assessment and problem-solving tools. Accessibility received full marks with a score of 100%, highlighting strengths in engaging learning modes and cognitive load reduction. Social interaction was rated lower at 58%, with limited enthusiasm for synchronous tool integration.

Zee: Zee rated usability at the highest level with a score of 100%, mirroring Rachel and Cheryl's assessments. Feedback was rated highly with a score of 92%, with structured educator feedback standing out. Scaffolding showed stronger support with a score of 75%, with high scores for problem-solving tools but lower for self-assessment. Accessibility scored well at 83%, with a focus on reducing cognitive load, though media control customization was flagged.

Social interaction scored 67%, which indicated moderate support since asynchronous tools rated higher than synchronous ones.

Team Responses

As a team, usability emerged as the most substantial area, achieving unanimous high scores of 100% across all criteria, demonstrating exceptional platform access, intuitive design, and application variety. Feedback was another well-supported feature with a score of 86%, with team consensus on the strength of structured feedback and peer-to-peer mechanisms, though instant feedback was moderately rated. Scaffolding received mixed scores and an average score of 58%, with team members identifying significant gaps in self-assessment and varied support for complex problem-solving. Accessibility scored highly with 83%, particularly for reducing cognitive load, though media control received inconsistent ratings. Social interaction scored 69% which showed solid support for collaborative and asynchronous tools, but synchronous functionalities were collectively identified as an area needing improvement. This alignment of observations underscores key strengths and areas for targeted development.

Figure 2

Overview Percentages Chart

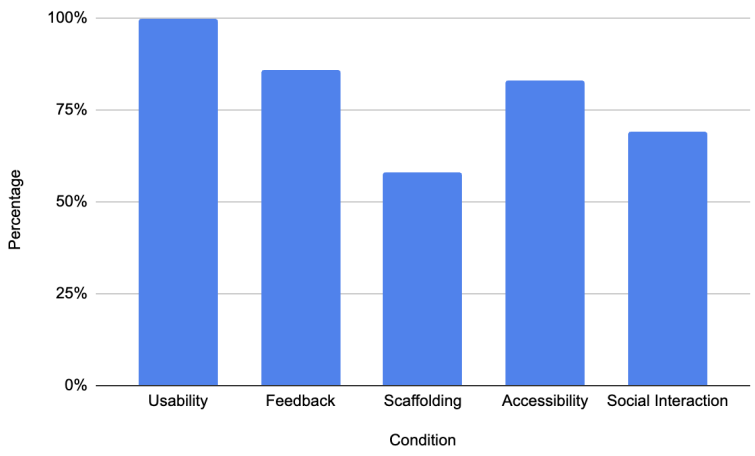

Table 2

Summary Table: TSLE Individual and Total Scores

Measure	Scores			
	Rachel	Cheryl	Zee	Combined
1.0 Usability				
1.1 Facilitates access across systems, devices, and browsers	4	4	4	12
1.2 Offers an intuitive interface	4	4	4	12
1.3 Uses various applications (video, voice, text)	4	4	4	12
Total	12	12	12	36
2.0 Feedback				
2.1 Provides instant, automated, and personalized feedback	2	3	3	8
2.2 Enables peer-to-peer feedback	3	4	4	11
2.3 Allows educators to provide structured, custom feedback	4	4	4	12
Total	9	11	11	31
3.0 Scaffolding				
3.1 Provides step-by-step guidance tailored to skill levels	3	4	3	10
3.2 Offers self-assessment opportunities	1	1	2	4
3.3 Provides tools to solve complex problems	2	1	4	7
Total	6	6	9	21

4.0 Accessibility				
4.1 Offers multiple ways to engage and express learning	3	4	4	11
4.2 Allows control of media	2	4	1	7
4.3 Reduces cognitive load	4	4	5	12
Total	9	12	10	30
5.0 Social Interaction				
5.1 Facilitates collaborative learning experiences	3	3	3	9
5.2 Incorporates asynchronous communication	4	3	4	11
5.3 Includes synchronous tools like live chats, video conferencing, and shared screen options to support real-time collaboration.	3	1	1	5
Total	10	7	8	25

Analysis

Observed Criterion

The TSLE effectively supported usability, feedback, scaffolding, and accessibility, with strong performance in seamless navigation, system compatibility, diverse tools, and flexible engagement options. Feedback mechanisms were robust, including automated, peer, and instructor feedback, while scaffolding provided tailored guidance and critical thinking support, while self-assessment opportunities were limited. Accessibility excelled in reducing cognitive load but lacked advanced media control customization. Social interaction featured strong asynchronous tools and collaboration but underperformed in synchronous functionalities.

Overall, the platform demonstrated solid support across most areas, with room for targeted enhancements.

Usability

Usability features were strongly supported across all criteria. For instance, with a perfect total score of 12 points, the platform effectively facilitated access across systems, devices, and browsers. Additionally, an intuitive interface, with a perfect total score of 12, made navigation seamless; diverse applications – like video, voice, and text – received a total score of 12, ensuring flexibility in learning.

Feedback

Feedback features were prominently observed, as evident in the high scores. Instant, automated, and personalized feedback received a total score of 8 since it provided learners with timely insights. Peer-to-peer feedback mechanisms received a total score of 11 since they encouraged collaborative evaluation. While educators were equipped to offer structured, custom feedback received a total score of 12, indicating enhanced options for guidance.

Scaffolding

Scaffolding was generally well-supported. Step-by-step guidance tailored to skill levels received a total score of 10 because it effectively met learner needs. However, self-assessment opportunities scored lower at 4, indicating limited emphasis or challenging observation of this feature. Tools to solve complex problems received a total score of 7 since it demonstrated strong support for critical thinking.

Accessibility

Accessibility criteria were mainly well-supported. Features like offering multiple ways to engage and express learning, which received a total score of 11, and reducing cognitive load,

which received a total score of 12, were notable strengths. However, control of media received a lower total score of 7, potentially highlighting a lack of customization options.

Social Interaction

Social interaction features showed mixed support. Collaborative learning experiences, which received a total score of 11, and asynchronous communication tools, which received a total score of 9, were robustly integrated. However, synchronous tools for real-time collaboration scored lower at 5, reflecting limited functionality or use.

Unobserved Criterion

Several learning design characteristics in the TSLE were unobserved or minimally present, raising questions about their inclusion or detectability. Self-assessment opportunities may have been underrepresented or subtly integrated, making them difficult to identify. Accessibility features, such as complete media control, were either absent or not prominently displayed, limiting their observability. Similarly, synchronous tools appeared minimally included or underutilized, suggesting a possible focus on asynchronous interaction or integration challenges. These gaps highlight the need for clearer, more intentional design to ensure key features are both present and observable.

Scaffolding

The relatively low score for self-assessment opportunities suggests this feature was either underrepresented in the TSLE design or difficult to identify during observation. It is possible that the lack of observable instances was due to the nature of the self-assessment tools, which may have been embedded within the platform in ways not immediately apparent to observers. Alternatively, this feature might not have been explicitly included in the design, resulting in its limited presence during the evaluation process. The absence of clear prompts or scaffolding

mechanisms to guide learners in reflecting on their progress further supports the likelihood of its exclusion from the TSLE design.

Accessibility

The difficulty in observing complete media control may indicate either its absence in the design or challenges in determining its extent during evaluation. For example, while the TSLE might have incorporated accessibility features such as media playback controls, they may not have been prominently displayed or readily accessible to users, making them hard to detect during observation. This ambiguity raises questions about whether the feature was intentionally omitted or simply underutilized by the learners. A more explicit integration of media control tools could have clarified their existence and functionality within the design.

Social Interaction

The lower score for synchronous tools may suggest minimal inclusion in the design or challenges in observing their practical use. Synchronous tools, such as live chat or video conferencing, may have been present but underutilized due to the nature of the activities observed or scheduling conflicts among participants. Alternatively, their limited implementation might indicate a deliberate design decision to prioritize asynchronous interaction methods. The lack of visible engagement with synchronous tools during the evaluation further complicates efforts to assess their role and effectiveness in facilitating meaningful social interaction within the TSLE.

Conclusion and Recommendations

In conclusion, the TSLE of EDRS 810: Education Research Methods excels as a thoughtfully designed course that effectively supports diverse learning needs, particularly in fostering usability, meaningful feedback, and accessibility. To further enhance its impact, it is

recommended to integrate more opportunities for synchronous interaction to promote real-time collaboration among students, expand self-assessment tools to encourage learner autonomy and reflective practice, and incorporate advanced strategies for accessibility and engagement. By addressing these areas, the course can provide an even more dynamic and adaptive educational experience, empowering students to deepen their understanding of research methods.

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Appendix A

Report Data Summary Table

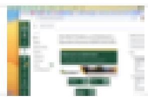
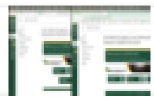
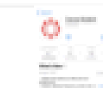
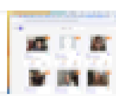
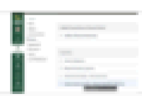
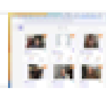
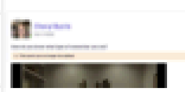
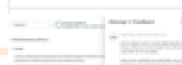
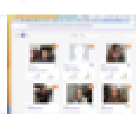
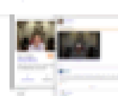
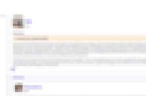
Measure	Scores			
	Rachel	**Cheryl**	**Zee**	**Combined**
1.0 Usability				
1.1 Facilitates access across systems, devices, and browsers	4	4	4	12
1.2 Offers an intuitive interface	4	4	4	12
1.3 Uses various applications (video, voice, text)	4	4	4	12
Usability Score	12	12	12	36
Usability Percentage	100%	100%	100%	100%
2.0 Feedback				
2.1 Provides instant, automated, and personalized feedback	2	3	3	8
2.2 Enables peer-to-peer feedback	3	4	4	11
2.3 Allows educators to provide structured, custom feedback	4	4	4	12
Feedback Score	9	11	11	31
Feedback Percentage	75%	92%	92%	86%
3.0 Scaffolding				
3.1 Provides step-by-step guidance tailored to skill levels	3	4	3	10
3.2 Offers self-assessment opportunities	1	1	2	4
3.3 Provides tools to solve complex problems	2	1	4	7
Scaffolding Score	6	6	9	21

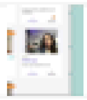
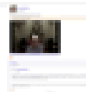
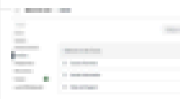
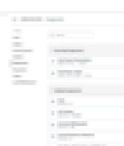
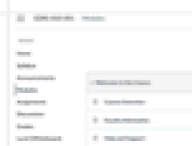
Scaffolding Percentage	50%	50%	75%	58%
4.0 Accessibility				
4.1 Offers multiple ways to engage and express learning	3	4	4	11
4.2 Allows control of media	2	4	1	7
4.3 Reduces cognitive load	4	4	5	12
Accessibility Score	9	12	10	30
Accessibility Percentage	75%	100%	83%	83%
5.0 Social Interaction				
5.1 Facilitates collaborative learning experiences	3	3	3	9
5.2 Incorporates asynchronous communication	4	3	4	11
5.3 Includes synchronous tools like live chats, video conferencing, and shared screen options to support real-time collaboration.	3	1	1	5
Social Interaction Score	10	7	8	25
Social Interaction Percentage	83%	58%	67%	69%

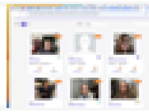
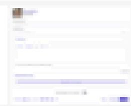
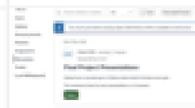
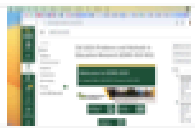
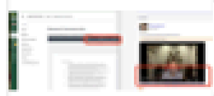
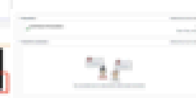
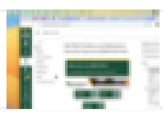
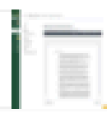
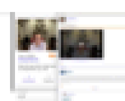
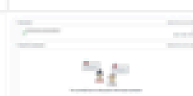
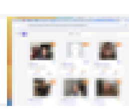
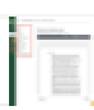
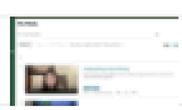
Appendix B

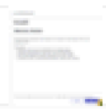
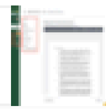
Report Chart and Tables

TSLE Scale Responses Table

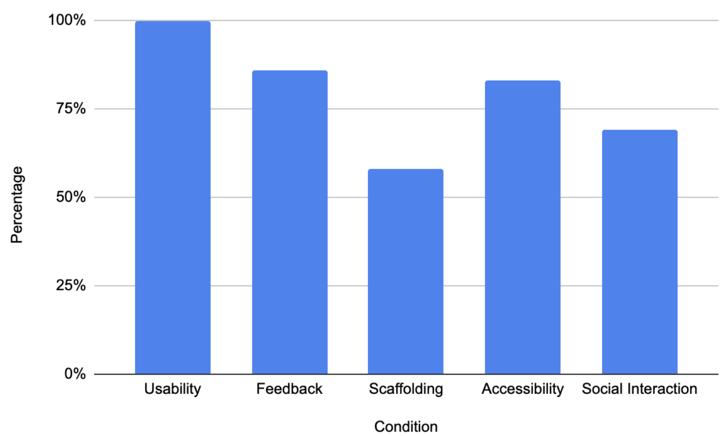
TSLE SCALE RESPONSES: Canvas Rachel, Cheryl, Zee				
Responses Submitted Timestamp	12/4/2024 14:22:49	12/4/2024 11:29:27	12/3/2024 0:47:06	TEAM SCORES
Before you begin, who is submitting this form?	Rachel Lugo	Cheryl Burris	Yueqing (Zee) Zhong	
1.0 USABILITY				
1.1 TSLE facilitates access across operating systems (PC or Mac), devices (phones, tablets, laptops, desktops), and web browsers (Chrome, Safari, Firefox).	4	4	4	**12**
1.1 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1FjwoqRumTHkFLG-iRM13jVzdi2yeboFb	https://drive.google.com/open?id=1yJO4q8T1O-W34uPqa0D2maLYI-C5_bIT	https://drive.google.com/open?id=1XeTYPWg6sAO72MBqO8UrvV6I0eBlkZw2	
				
1.1 OPTIONAL: Add remarks for your evidence.	Used on phone, my surface book, and apple at school	screenshot displays Canvas course open in both Apple's Safari and Google Chrome	This evidence shows the accessibility of Canvas from Apple Store.	
1.2 TSLE offers an intuitive interface.	4	4	4	**12**
1.2 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1XeVliGOe3WmTJauPAbI5mFo0UBhlcYC6	https://drive.google.com/open?id=1OiDe_WCgKJBxlISI_SRYDm9MurC2MhDf	https://drive.google.com/open?id=1OhO6qpNyrhtSHKyZ62DvNMMV1glJ8yC	
				
1.2 OPTIONAL: Add remarks for your evidence.		(1) LEFT SIDE: interface uses icons, labels, and navigation bar to engage with the course; (2) RIGHT SIDE: easy to find optional items (such as the "To Do" and "Recent Feedback"); and (3) CENTER: selected page of the course.	The interface is easy to access, read, and understand.	
1.3 TSLE uses with a variety of applications (video, voice, text) to demonstrate learning.	4	4	4	**12**
1.3 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1KMBLivZaYZXlogQjrfV2ZMeL8nFTs_	https://drive.google.com/open?id=1El9yPmJJ7DEoR-ycdGu0RkEq8X0dyakq	https://drive.google.com/open?id=18TautDXa7V6JrlnDKOsZXeZVpo24.QH	
				
1.3 OPTIONAL: Add remarks for your evidence.		Option to submit my response to the discussion post as either text, video, or voice recording.	This screenshot shows the Kaltura Capture recording material in assisting learning.	
2.0 FEEDBACK				
2.1 TSLE provides instant, automated, and personalized feedback to guide learners instantly.	2	3	3	**8**
2.1 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1PBv3NjOL5SqwafWYsJrLZUKOn-hfCCGP	https://drive.google.com/open?id=1pQbxaTo5-HS9bMtub9l6nXTbQsja0Vh	https://drive.google.com/open?id=116OQ_5YTh6H02lEpWp-Gn6y5csiWrd6f	
				
2.1 OPTIONAL: Add remarks for your evidence.	Feedback such as an assignment was received or that you can see something has posted in instant	While the system provides instant feedback about errors, there is no personalization.	This screenshot shows the homework feedback displayed on Canvas as soon as the instructor uploaded.	
2.2 TSLE enables peer-to-peer feedback through collaborative tools like shared documents, forums, or group assessments.	3	4	4	**11**
2.2 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1kcLEBQJD1TtXgQt6pgUtNBQRae9jUK-B	https://drive.google.com/open?id=1067oGDyXJ3hkNNNFCSOHskOk3PpPCYJa	https://drive.google.com/open?id=18K6mAwYXbow3B7hBc4lrhSnKfOmIJ-	
				

TSLE SCALE RESPONSES: Canvas Rachel, Cheryl, Zee				
Responses Submitted Timestamp	12/4/2024 14:22:49	12/4/2024 11:29:27	12/3/2024 0:47:06	TEAM SCORES
Before you begin, who is submitting this form?	Rachel Lugo	Cheryl Burris	Yueqing (Zee) Zhong	
2.2 OPTIONAL: Add remarks for your evidence.		Lucid chart offers collaboration with groups and discussion board offers options for peer & instructor feedback	TSLE allows peer feedback and comment under posts to assist collaboration.	
2.3 TSLE allows educators to provide structured, custom feedback on learner submissions.	4	4	4	12
2.3 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=12bA4B5RwKJrstbrTM7WACa0vkDQWFCb6	https://drive.google.com/open?id=1jpYTGLRagC08WuwCY_04EyfTrhbrQVT	https://drive.google.com/open?id=1VSzhZDgzoqYGmugcRasNNkyW49jgto-	
				
2.3 OPTIONAL: Add remarks for your evidence.		Instructor remarks tailored to my discussion video	TSLE allows customized feedback from educator to Canvas users.	
3.0 SCAFFOLDING				10
3.1 TSLE provides step-by-step guidance or prompts tailored to learners' current skill levels.	3	4	3	
3.1 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=13sDGj_Z8AM8DwUWz5-1HAPc4waBSLK	https://drive.google.com/open?id=1xfhgFLRajmLt3aseqrTka06hk2aBOVk	https://drive.google.com/open?id=1xMFk8yyVNeFnUIgBTZIVG7CW3w0HKf5u	
				
3.1 OPTIONAL: Add remarks for your evidence.		Clear guidance was provided for assignments outside of the discussion posts (see image). Guidance was also posted at the top of each discussion board for how to complete the assignment (not shown).	Canvas allow chat with technical support in learning and guidance.	
3.2 TSLE offers self-assessment opportunities to evaluate their learning and provides review/refresher content for missed items.	1	1	2	4
3.2 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=18bMv5ZX0gw3LL0XEbyylolFozPzuSj	https://drive.google.com/open?id=1Rzl-9pNh6RPK6i3g2C-mkf0iM-h6Ma7	https://drive.google.com/open?id=1OFV59e1K0oroglzcyeF0FVVn7FSU57j	
				
3.2 OPTIONAL: Add remarks for your evidence.		Self-assessment is not an option within the TSLE. The instructor must provide this ability outside of the TSLE.	Adaptive learning tool is in learning Canvas instead of learning courses in Canvas.	
3.3 TSLE offers tools (e.g., hints, models, examples, or templates) to aid learners in solving complex problems.	2	1	4	7
3.3 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1JfCfanyZ8kkawDUP0PX3mU8-LN72_s8_	https://drive.google.com/open?id=1Et8czZ58DIrKkcjdIZKWbLxX5Zid8zd	https://drive.google.com/open?id=1BZuA32TRT-d7UwWCs7IDifVo68x21Rpl	
				
3.3 OPTIONAL: Add remarks for your evidence.		this is not an option for this course	In module session, TSLE allows instructors in posting tools (e.g., hints, models, examples, or templates) to aid learners in solving complex problems.	
4.0 ACCESSIBILITY				11
4.1 TSLE offers multiple ways to engage, represent, and express learning.	3	4	4	

TSLE SCALE RESPONSES: Canvas Rachel, Cheryl, Zee				
Responses Submitted Timestamp	12/4/2024 14:22:49	12/4/2024 11:29:27	12/3/2024 0:47:06	TEAM SCORES
Before you begin, who is submitting this form?	Rachel Lugo	Cheryl Burris	Yueqing (Zee) Zhong	
4.1 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1N65duF1aGZ99qfCvTRJ8FGL5H5zaxvn	https://drive.google.com/open?id=16dJ_rcHkN6LY1k8UfedfAdGtcFkZH	https://drive.google.com/open?id=1nyLTyaEzsJg2LknRkOGBEwkqyWghlgRoU	
				
4.1 OPTIONAL: Add remarks for your evidence.		We can submit text, video, or voice recordings for our discussion boards to express our learning about the assigned readings.	Comments are available in most sessions, the example shows the option in engagement based on instructor's teaching.	
4.2 TSLE allows control of media. Some examples are video playback, turning on captioning, and increasing/decreasing the volume	**2**	**4**	**1**	**7**
	https://drive.google.com/open?id=1E7bD8g-FxEf4Egg003ptC_35lozCKPru	https://drive.google.com/open?id=1XkqVT4F-xhnqjs8goUWbVId3MpZyyH52	https://drive.google.com/open?id=1yrfLtQW1fTqjuM8RS5u3ttALH9HwmRg	
4.2 Provide evidence by submitting a screenshot image.				
4.2 OPTIONAL: Add remarks for your evidence.		(1) Videos offer the option to control playback, CC on or off, and +/- volume, and (2) attachments offer the option to +/- zoom, expand to full screen, and start from the beginning. (see red boxes on image)	Students are required to engage if necessary, vice versa.	
4.3 TSLE reduces cognitive load by using clear labeling, including white space, eliminating unnecessary text/visual elements, and employing a consistent hierarchy and navigation design.	**4**	**4**	**4**	**12**
	https://drive.google.com/open?id=1PwUJvzk-uDloUx0HP5Q-eYzKdkj5dowR	https://drive.google.com/open?id=1NvEbcixBgQ8Ks04HyNxLH0EdgZbGfpBW	https://drive.google.com/open?id=1DKpobNeozfHxjL-7L-yXppENiwkeRtz	
4.3 Provide evidence by submitting a screenshot image.				
4.3 OPTIONAL: Add remarks for your evidence.		minimal distractions, consistent design, clear labeling, and plenty of white space to aid with focusing only on the assignment	The announcement layout is easy and clear to read,	
5.0 SOCIAL INTERACTION				9
5.1 TSLE facilitates collaborative learning experiences through group projects and peer discussions.	**3**	**3**	**3**	
	https://drive.google.com/open?id=1C6FCWkO-aV_uGE4ekYib5BH1a3M0z8kq	https://drive.google.com/open?id=1CztzvSWmDlrTB0bF3vmh9dQln93RweRj	https://drive.google.com/open?id=1HljFYsmcX9QbD1UlJv1kEtkPMihwxKaf	
5.1 Provide evidence by submitting a screenshot image.				
5.1 OPTIONAL: Add remarks for your evidence.	within each module there are shared powerpoints and opportunities for group work to be completed in class	While lucid chart is offered, it is the only option for group collaborations and discussions.	This application is accessible only if it's open to students.	
5.2 TSLE incorporates asynchronous communication channels such as messages, forums, blogs, and recorded videos for flexible interactions.	**4**	**3**	**4**	**11**
	https://drive.google.com/open?id=1xWHpsSG9yLcGh208p87_mLEnbklZogfl	https://drive.google.com/open?id=186ghJv6HBthrYxb3mkFer9UbyqHvrff	https://drive.google.com/open?id=17JLpiuMcFCjcjCxNoy_5kHpGLemRqcy	
5.2 Provide evidence by submitting a screenshot image.				

TSLE SCALE RESPONSES: Canvas Rachel, Cheryl, Zee				
Responses Submitted Timestamp	12/4/2024 14:22:49	12/4/2024 11:29:27	12/3/2024 0:47:06	TEAM SCORES
Before you begin, who is submitting this form?	Rachel Lugo	Cheryl Burris	Yueqing (Zee) Zhong	
5.2 OPTIONAL: Add remarks for your evidence.		The only embedded asynchronous option the TSLE offers is email (see red boxes on the image).	Students are re-watch the zoom recordings and review learning materials.	
5.3 TSLE includes synchronous tools like live chats, video conferencing, and shared screen options to support real-time collaboration.	3	1	1	5
5.3 Provide evidence by submitting a screenshot image.	https://drive.google.com/open?id=1bEz18K2gBVN0Bwn7ouV1wGR2tdnAHThv 	https://drive.google.com/open?id=1rMa8Wbxo4VJfc3aL_RkeQgt8NzuneY 	https://drive.google.com/open?id=1GonJi-dlqKoJuFSCqp4X7GLm3XjYts 	
5.3 OPTIONAL: Add remarks for your evidence.		No embedded synchronous options are offered by the TSLE (see red boxes on the image).	Not applicable from my Canvas although it seems available.	

Overview Chart



Score Overview Table

Condition	Percentage	Score
Usability	100%	36 / 36
Feedback	86%	31 / 36
Scaffolding	58%	21 / 36
Accessibility	83%	30 / 36
Social Interaction	69%	36 / 36

Appendix C

Completed by Rachel: Technology Supported Learning Environment Scale Form

TSLE Learning Design Principles Scale

Use this form to evaluate the Canvas Course, *EDRS 810 - Problems and Methods In Education Research.*

Before you begin, who is submitting this form? *

Rachel Lugo

This is what you need to know before you begin:

> Please answer each question.
> Please upload one screenshot as evidence for each item.
> You can add optional remarks below the evidence.
> Here is a scoring key for the Likert scale:
    1 Strongly Disagree = Found no evidence
    2 Disagree = Found minimal evidence
    3 Agree = Easily found evidence
    4 Strongly Agree = Found an abundance of evidence

> OK - Ready to begin? ***Let's go!***

1.0 USABILITY

Usability is the "fulfillment of functional requirements... performance and well-being, mainly from the user's perspective" (Iwarsson & Stahl, 2003, p. 60). Additionally, it "...entails evaluating affordances of a technology platform but doing so from a lens of the activities and experiences that learners will engage in specifically in the system" Moore & Tillberg-Webb, 2023).

12/7/24, 9:09 PM TSLE Learning Design Principles Scale

Scoring Key for the Likert Scale:

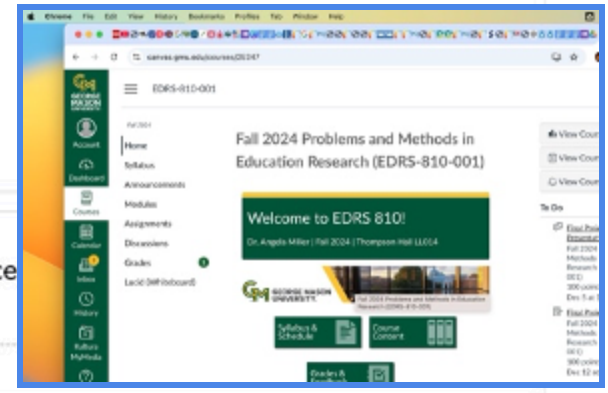
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

1.1 TSLE facilitates access across operating systems (PC or Mac), devices (phones, tablets, laptops, desktops), and web browsers (Chrome, Safari, Firefox). *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

1.1 Provide evidence by submitting a screenshot image. *

Image 12-2-24 at...



1.1 OPTIONAL: Add remarks for your evidence

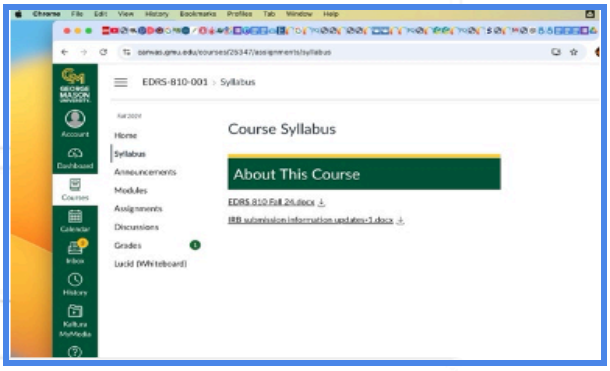
Used on phone, my surface book, and apple at school

1.2 TSLE offers an intuitive interface. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

1.2 Provide evidence by submitting a screenshot image. *

Image 12-2-24 at...



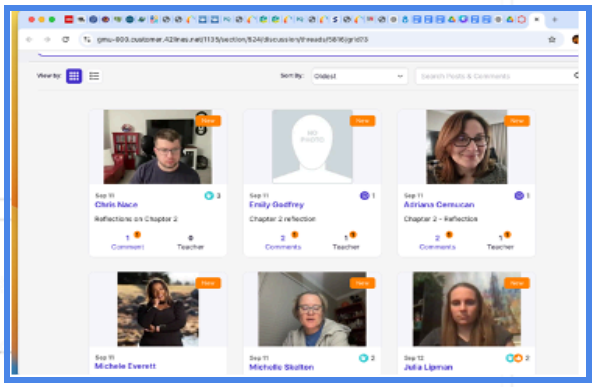
1.2 OPTIONAL: Add remarks for your evidence.

1.3 TSLE uses with a variety of applications (video, voice, text) to demonstrate learning. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

1.3 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



1.3 OPTIONAL: Add remarks for your evidence.

2.0 FEEDBACK

Feedback gives learners meaningful insights into their progress, helping refine learning strategies and improve outcomes. Technology facilitates this process by offering instant, personalized feedback and enabling peer-to-peer and instructor-to-learner communication (Hattie & Timperley, 2007; Allen, 2016).

Scoring Key for the Likert Scale:

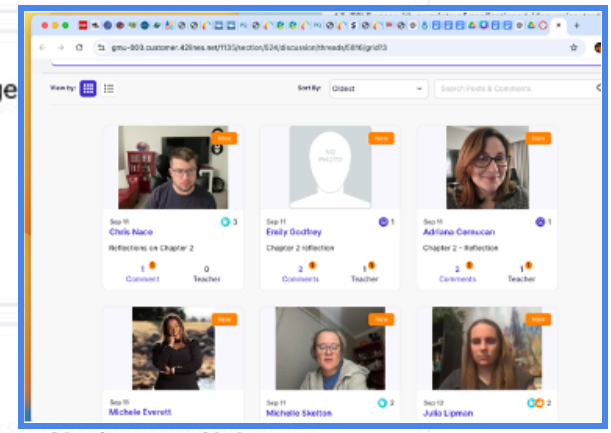
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

2.1 TSLE provides instant, automated, and personalized feedback to guide learners instantly. *

	1	2	3	4	
Strongly Disagree	○	◉	○	○	Strongly Agree

2.1 Provide evidence by submitting a screenshot image

Screenshot 2024...



2.1 OPTIONAL: Add remarks for your evidence.

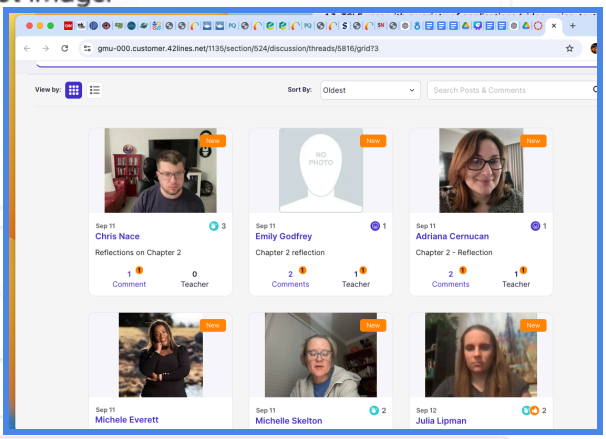
Feedback such as an assignment was received or that you can see something has posted in instant

2.2 TSLE enables peer-to-peer feedback through collaborative tools like shared documents, forums, or group assessments. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

2.2 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



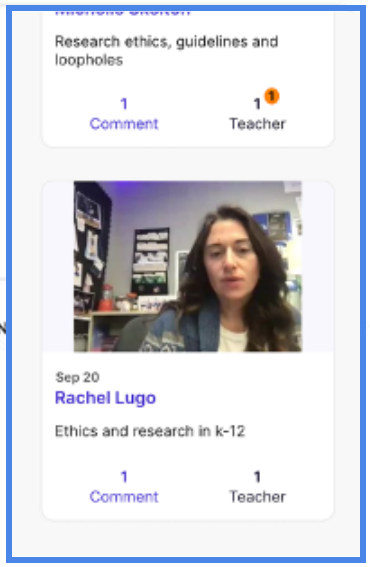
2.2 OPTIONAL: Add remarks for your evidence.

2.3 TSLE allows educators to provide structured, custom feedback on learner submissions. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

2.3 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



2.3 OPTIONAL: Add remarks for your evidence.

3.0 SCAFFOLDING

Scaffolding provides learners temporary support to accomplish tasks they cannot yet complete independently, using step-by-step guidance or adaptive technologies. This support decreases as learners gain competence, fostering independence (Wood, Bruner, & Ross, 1976; Rambe, 2012).

Scoring Key for the Likert Scale:

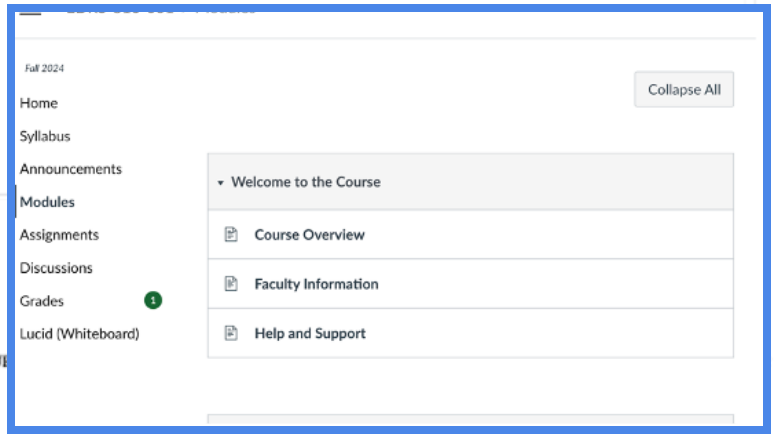
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

3.1 TSLE provides step-by-step guidance or prompts tailored to learners' current skill levels. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

3.1 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



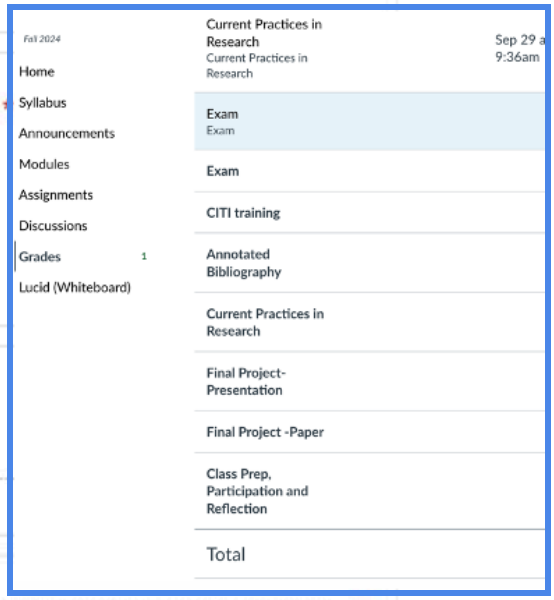
3.1 OPTIONAL: Add remarks for your evidence.

3.2 TSLE offers self-assessment opportunities to evaluate their learning and provides review/refresher content for missed items. *

	1	2	3	4	
Strongly Disagree	◉	○	○	○	Strongly Agree

3.2 Provide evidence by submitting a screenshot image. *

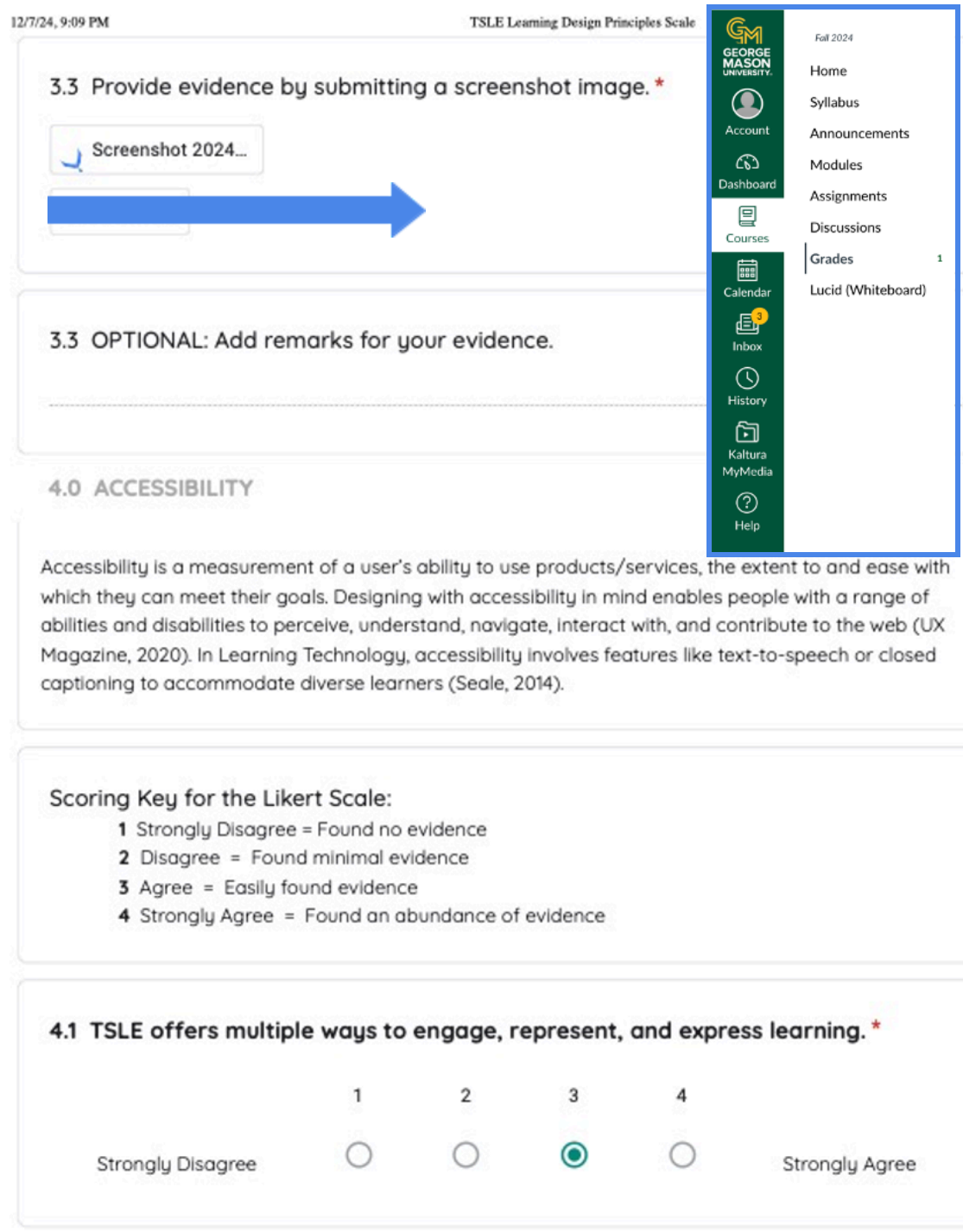
Screenshot 2024...



3.2 OPTIONAL: Add remarks for your evidence.

3.3 TSLE offers tools (e.g., hints, models, examples, or templates) to aid learners in solving complex problems. *

	1	2	3	4	
Strongly Disagree	○	◉	○	○	Strongly Agree



12/7/24, 9:09 PM TSLE Learning Design Principles Scale

3.3 Provide evidence by submitting a screenshot image. *

Screenshot 2024...

3.3 OPTIONAL: Add remarks for your evidence.

4.0 ACCESSIBILITY

Accessibility is a measurement of a user's ability to use products/services, the extent to and ease with which they can meet their goals. Designing with accessibility in mind enables people with a range of abilities and disabilities to perceive, understand, navigate, interact with, and contribute to the web (UX Magazine, 2020). In Learning Technology, accessibility involves features like text-to-speech or closed captioning to accommodate diverse learners (Seale, 2014).

Scoring Key for the Likert Scale:

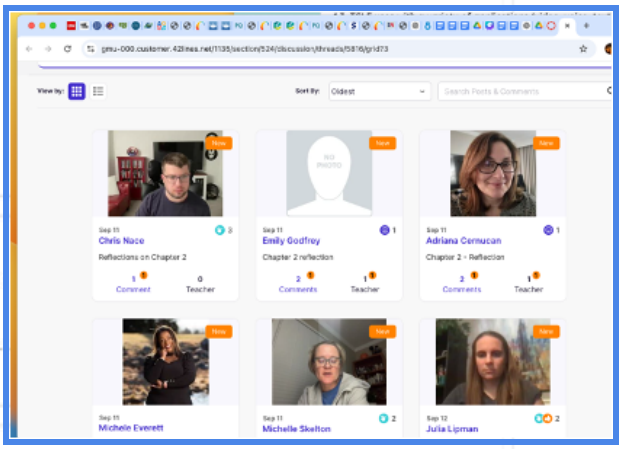
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

4.1 TSLE offers multiple ways to engage, represent, and express learning. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

4.1 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



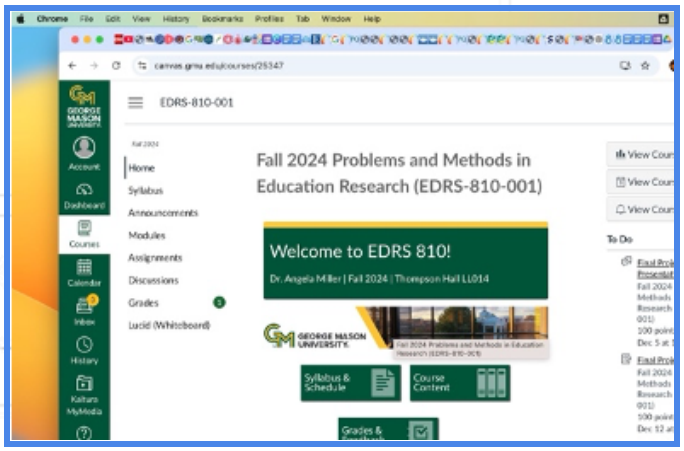
4.1 OPTIONAL: Add remarks for your evidence.

4.2 TSLE allows control of media. Some examples are video playback, turning on captioning, and increasing/decreasing the volume *

	1	2	3	4	
Strongly Disagree	○	◉	○	○	Strongly Agree

4.2 Provide evidence by submitting a screenshot image. *

Image 12-2-24 at...



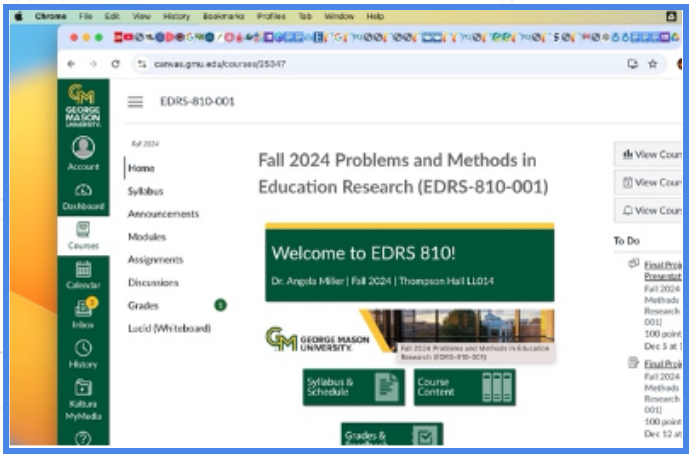
4.2 OPTIONAL: Add remarks for your evidence.

4.3 TSLE reduces cognitive load by using clear labeling, including white space, eliminating unnecessary text/visual elements, and employing a consistent hierarchy and navigation design. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

4.3 Provide evidence by submitting a screenshot image. *

Image 12-2-24 at...



4.3 OPTIONAL: Add remarks for your evidence.

5.0 SOCIAL INTERACTION

Social interaction in a TSLE involves creating spaces for communication, collaboration, and knowledge-sharing among instructors and peers. It fosters active engagement, community building, and collective learning through synchronous and asynchronous methods (Koh, 2015).

Scoring Key for the Likert Scale:

1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

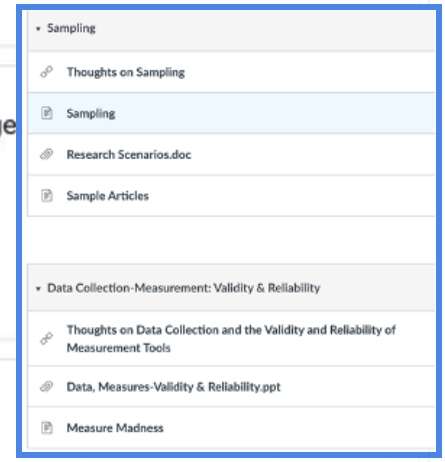
12/7/24, 9:48 PM TSLE Learning Design Principles Scale

5.1 TSLE facilitates collaborative learning experiences through group projects and peer discussions. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

5.1 Provide evidence by submitting a screenshot image

Screenshot 2024...



5.1 OPTIONAL: Add remarks for your evidence.

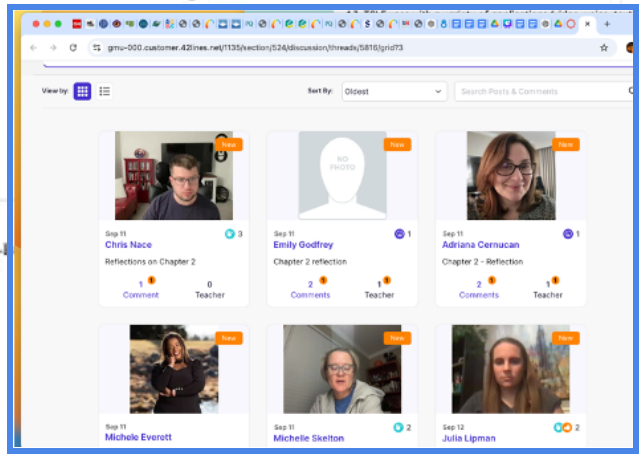
within each module there are shared powerpoints and opportunities for group work to be completed in class

5.2 TSLE incorporates asynchronous communication channels such as messages, forums, blogs, and recorded videos for flexible interactions. *

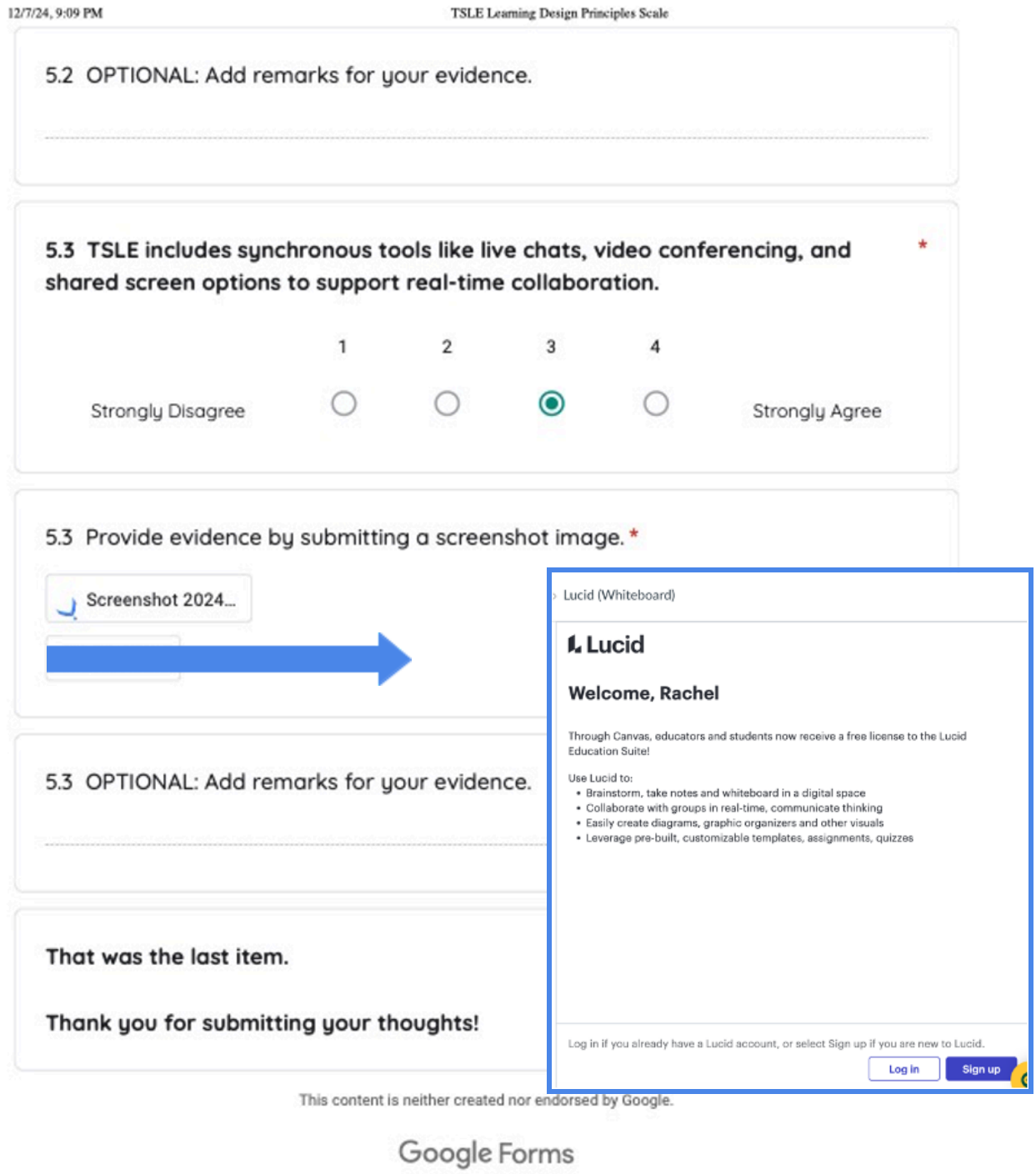
	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

5.2 Provide evidence by submitting a screenshot image. *

Screenshot 2024...

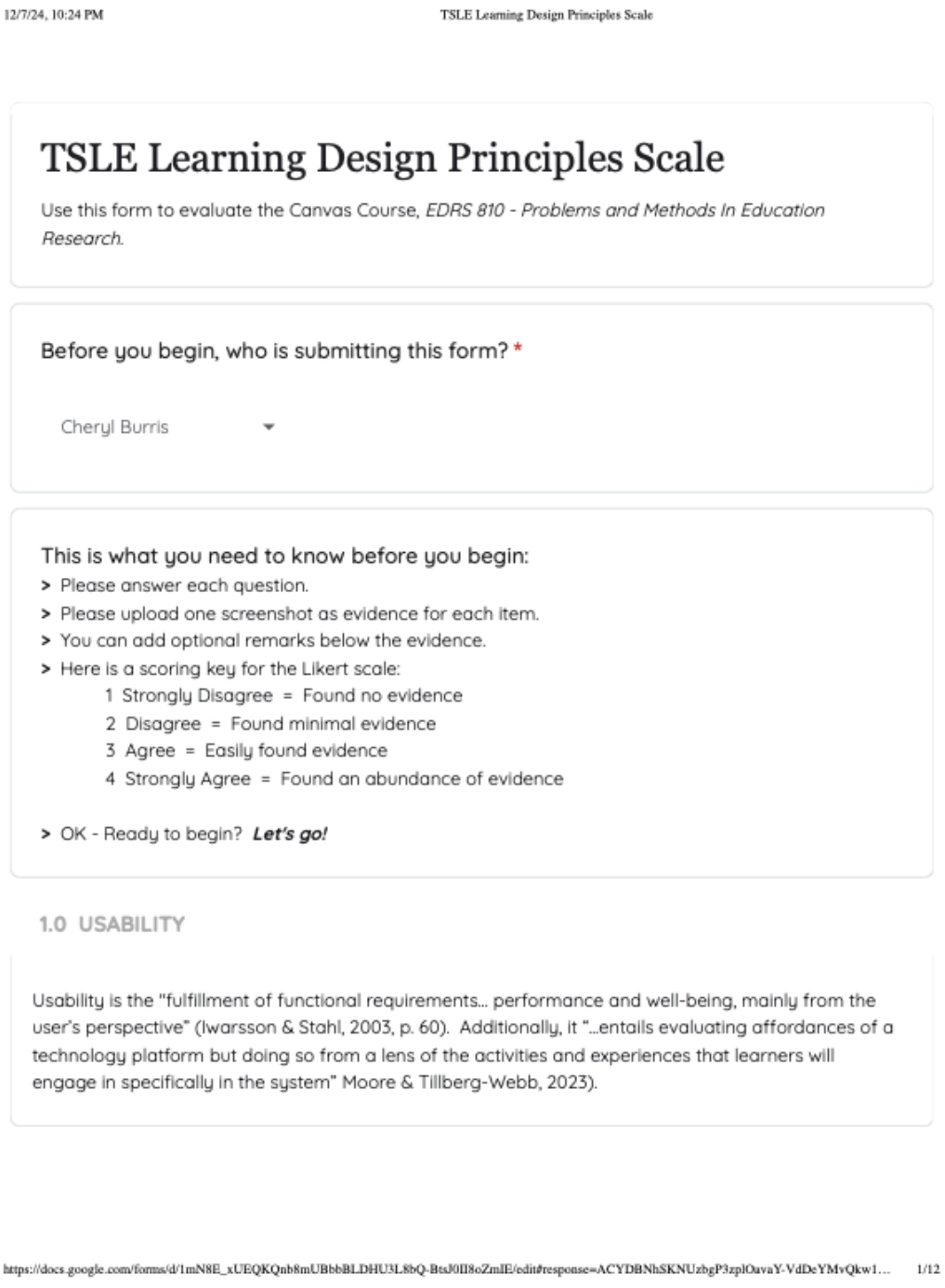


https://docs.google.com/forms/d/1mN8E_xUEQKQnb8mUBbbBLDHU3L8bQ-


12/7/24, 9:09 PM
TSLE Learning Design Principles Scale
5.2 OPTIONAL: Add remarks for your evidence.
5.3 TSLE includes synchronous tools like live chats, video conferencing, and shared screen options to support real-time collaboration. *
1
2
3
4
Strongly Disagree
Strongly Agree
5.3 Provide evidence by submitting a screenshot image. *
Screenshot 2024...
5.3 OPTIONAL: Add remarks for your evidence.
That was the last item.
Thank you for submitting your thoughts!
Lucid (Whiteboard)
Lucid
Welcome, Rachel
Through Canvas, educators and students now receive a free license to the Lucid Education Suite!
Use Lucid to:
• Brainstorm, take notes and whiteboard in a digital space
• Collaborate with groups in real-time, communicate thinking
• Easily create diagrams, graphic organizers and other visuals
• Leverage pre-built, customizable templates, assignments, quizzes
Log in if you already have a Lucid account, or select Sign up if you are new to Lucid.
Log in
Sign up
This content is neither created nor endorsed by Google.
Google Forms

Appendix D

Completed by Cheryl: Technology Supported Learning Environment Scale Form



12/7/24, 10:24 PM TSLE Learning Design Principles Scale

TSLE Learning Design Principles Scale

Use this form to evaluate the Canvas Course, *EDRS 810 - Problems and Methods In Education Research.*

Before you begin, who is submitting this form? *

Cheryl Burris

This is what you need to know before you begin:

> Please answer each question.
> Please upload one screenshot as evidence for each item.
> You can add optional remarks below the evidence.
> Here is a scoring key for the Likert scale:
    1 Strongly Disagree = Found no evidence
    2 Disagree = Found minimal evidence
    3 Agree = Easily found evidence
    4 Strongly Agree = Found an abundance of evidence

> OK - Ready to begin? ***Let's go!***

1.0 USABILITY

Usability is the "fulfillment of functional requirements... performance and well-being, mainly from the user's perspective" (Iwarsson & Stahl, 2003, p. 60). Additionally, it "...entails evaluating affordances of a technology platform but doing so from a lens of the activities and experiences that learners will engage in specifically in the system" Moore & Tillberg-Webb, 2023).

https://docs.google.com/forms/d/1mN8E_xUEQKQnb8mUBbbBLDHU3L8bQ-BtsJ0II8oZmIE/edit#response=ACYDBNhSKNUzbgP3zplOuvaY-VdDeYMvQkw1... 1/12

Scoring Key for the Likert Scale:

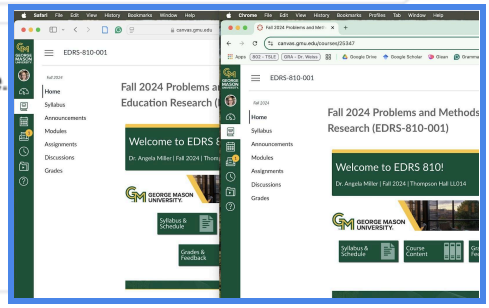
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

1.1 TSLE facilitates access across operating systems (PC or Mac), devices (phones, tablets, laptops, desktops), and web browsers (Chrome, Safari, Firefox). *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

1.1 Provide evidence by submitting a screenshot image.

Image 12-4-24 at...



1.1 OPTIONAL: Add remarks for your evidence.

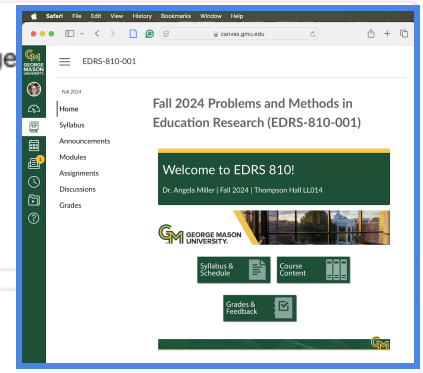
screenshot displays Canvas course open in both Apple's Safari and Google Chrome

1.2 TSLE offers an intuitive interface. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

1.2 Provide evidence by submitting a screenshot image

Screenshot 2024...



1.2 OPTIONAL: Add remarks for your evidence.

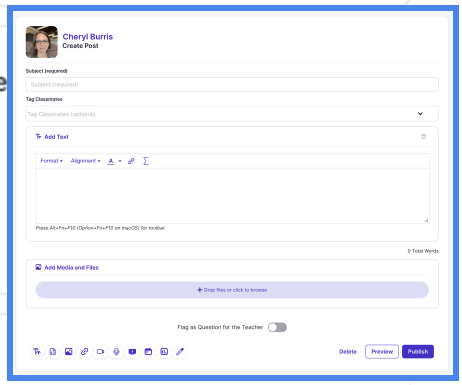
(1) LEFT SIDE: interface uses icons, labels, and navigation bar to engage with the course; (2) RIGHT SIDE: easy to find optional items (such as the "To Do" and "Recent Feedback"); and (3) CENTER: selected page of the course.

1.3 TSLE uses with a variety of applications (video, voice, text) to demonstrate learning. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

1.3 Provide evidence by submitting a screenshot image

Screenshot 2024...



1.3 OPTIONAL: Add remarks for your evidence.

Option to submit my response to the discussion post as either text, video, or voice recording.

2.0 FEEDBACK

Feedback gives learners meaningful insights into their progress, helping refine learning strategies and improve outcomes. Technology facilitates this process by offering instant, personalized feedback and enabling peer-to-peer and instructor-to-learner communication (Hattie & Timperley, 2007; Allen, 2016).

Scoring Key for the Likert Scale:

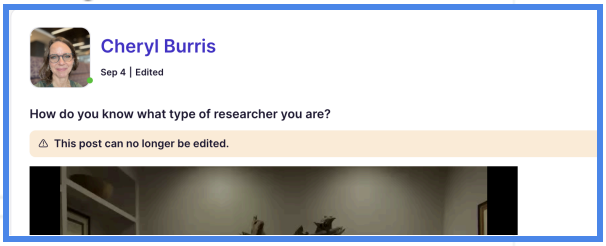
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

2.1 TSLE provides instant, automated, and personalized feedback to guide learners instantly. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

2.1 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



2.1 OPTIONAL: Add remarks for your evidence.

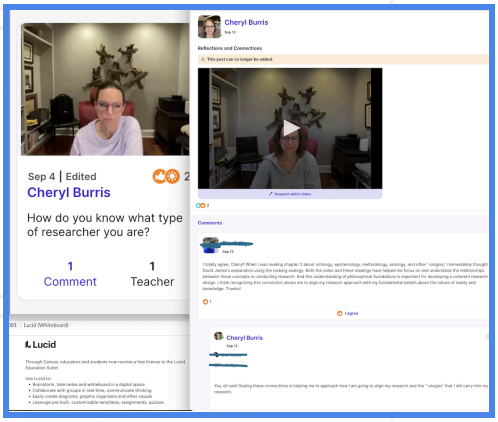
While the system provides instant feedback about errors, there is no personalization.

2.2 TSLE enables peer-to-peer feedback through collaborative tools like shared documents, forums, or group assessments. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

2.2 Provide evidence by submitting a screenshot image.

2.2 - Cheryl B..png



2.2 OPTIONAL: Add remarks for your evidence.

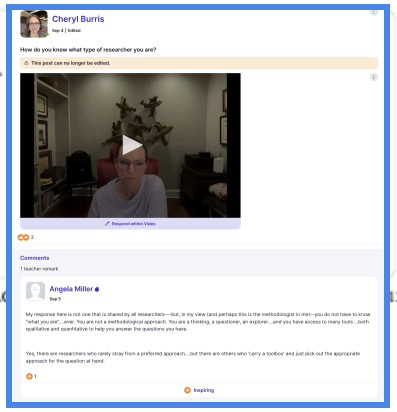
Lucid chart offers collaboration with groups and discussion board offers options for peer & instructor feedback

2.3 TSLE allows educators to provide structured, custom feedback on learner submissions. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

2.3 Provide evidence by submitting a screenshot image.

2.3 - Cheryl B..png



2.3 OPTIONAL: Add remarks for your evidence.

Instructor remarks tailored to my discussion video

3.0 SCAFFOLDING

Scaffolding provides learners temporary support to accomplish tasks they cannot yet complete independently, using step-by-step guidance or adaptive technologies. This support decreases as learners gain competence, fostering independence (Wood, Bruner, & Ross, 1976; Rambe, 2012).

Scoring Key for the Likert Scale:

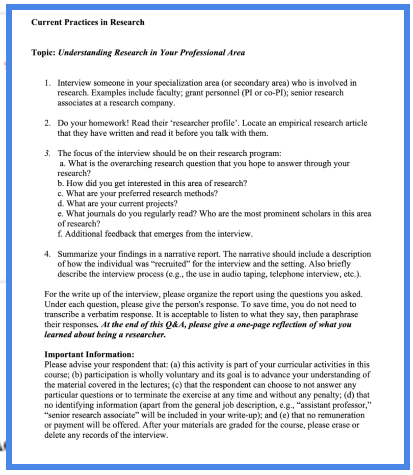
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

3.1 TSLE provides step-by-step guidance or prompts tailored to learners' current skill levels. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

3.1 Provide evidence by submitting a screenshot image.

3.1 - Cheryl B..png



Current Practices in Research

Topic: ***Understanding Research in Your Professional Area***

1. Interview someone in your specialization area (or secondary area) who is involved in research. Examples include faculty; grant personnel (PI or co-PI); senior research associates at a research company.
2. Do your homework! Read their 'researcher profile'. Locate an empirical research article that they have written and read it before you talk with them.
3. The focus of the interview should be on their research program:
   a. What is the overarching research question that you hope to answer through your research?
   b. How did you get interested in this area of research?
   c. What are your preferred research methods?
   d. What are your current projects?
   e. What journals do you regularly read? Who are the most prominent scholars in this area of research?
   f. Additional feedback that emerges from the interview.
4. Summarize your findings in a narrative report. The narrative should include a description of how the individual was "recruited" for the interview and the setting. Also briefly describe the interview process (e.g., the use in audio taping, telephone interview, etc.).

For the write up of the interview, please organize the report using the questions you asked. Under each question, please give the person's response. To save time, you do not need to transcribe a verbatim response. It is acceptable to listen to what they say, then paraphrase their responses. ***At the end of this Q&A, please give a one-page reflection of what you learned about being a researcher.***

Important Information:
Please advise your respondent that: (a) this activity is part of your curricular activities in this course; (b) participation is wholly voluntary and its goal is to advance your understanding of the material covered in the lectures; (c) that the respondent can choose to not answer any particular questions or to terminate the exercise at any time and without any penalty; (d) that no identifying information (apart from the general job description, e.g., "assistant professor," "senior research associate" will be included in your write-up); and (e) that no remuneration or payment will be offered. After your materials are graded for the course, please erase or delete any records of the interview.

3.1 OPTIONAL: Add remarks for your evidence.

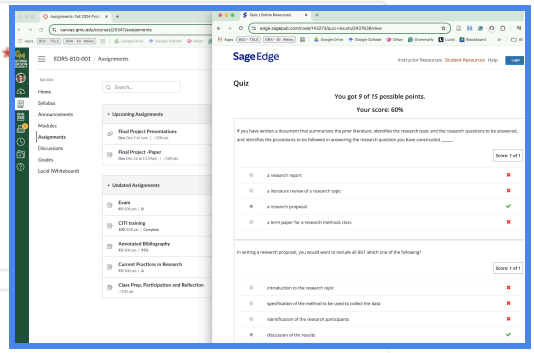
Clear guidance was provided for assignments outside of the discussion posts (see image). Guidance was also posted at the top of each discussion board for how to complete the assignment (not shown).

3.2 TSLE offers self-assessment opportunities to evaluate their learning and provides review/refresher content for missed items. *

	1	2	3	4	
Strongly Disagree	◉	○	○	○	Strongly Agree

3.2 Provide evidence by submitting a screenshot image. *

3.2 - Cheryl B..png



3.2 OPTIONAL: Add remarks for your evidence.

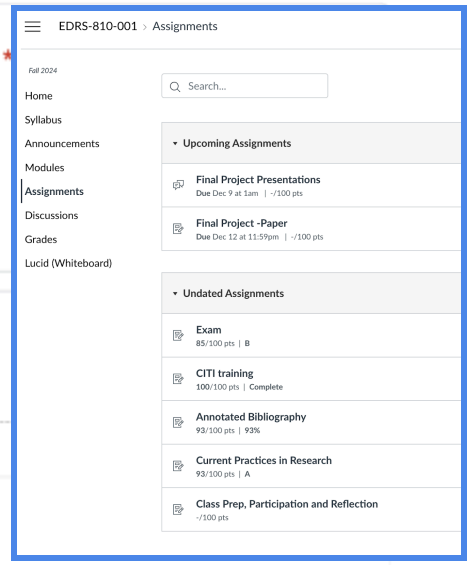
Self-assessment is not an option within the TSLE. The instructor must provide this ability outside of the TSLE.

3.3 TSLE offers tools (e.g., hints, models, examples, or templates) to aid learners in solving complex problems. *

	1	2	3	4	
Strongly Disagree	◉	○	○	○	Strongly Agree

3.3 Provide evidence by submitting a screenshot image. *

3.3 - Cheryl B..png



3.3 OPTIONAL: Add remarks for your evidence.

this is not an option for this course

4.0 ACCESSIBILITY

Accessibility is a measurement of a user's ability to use products/services, the extent to and ease with which they can meet their goals. Designing with accessibility in mind enables people with a range of abilities and disabilities to perceive, understand, navigate, interact with, and contribute to the web (UX Magazine, 2020). In Learning Technology, accessibility involves features like text-to-speech or closed captioning to accommodate diverse learners (Seale, 2014).

Scoring Key for the Likert Scale:

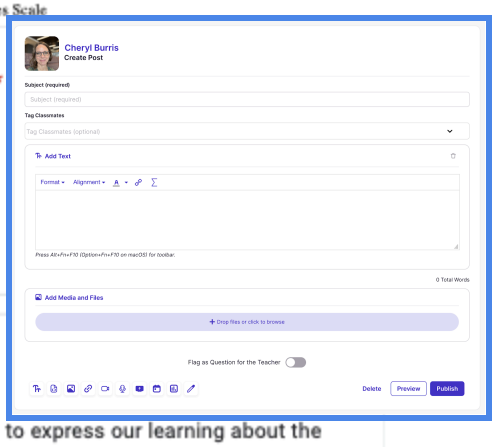
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

4.1 TSLE offers multiple ways to engage, represent, and express learning. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

4.1 Provide evidence by submitting a screenshot image. *

4.1 - Cheryl B..png



4.1 OPTIONAL: Add remarks for your evidence.

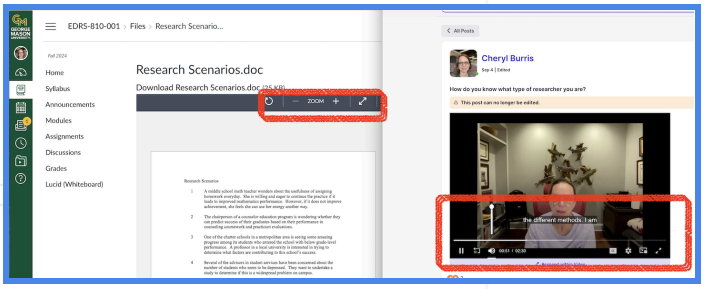
We can submit text, video, or voice recordings for our discussion boards to express our learning about the assigned readings.

4.2 TSLE allows control of media. Some examples are video playback, turning on captioning, and increasing/decreasing the volume *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

4.2 Provide evidence by submitting a screenshot image. *

4.2 - Cheryl B..png



4.2 OPTIONAL: Add remarks for your evidence.

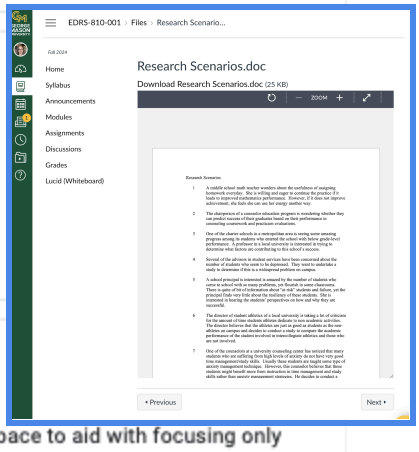
(1) Videos offer the option to control playback, CC on or off, and +/- volume, and (2) attachments offer the option to +/- zoom, expand to full screen, and start from the beginning. (see red boxes on image)

4.3 TSLE reduces cognitive load by using clear labeling, including white space, eliminating unnecessary text/visual elements, and employing a consistent hierarchy and navigation design. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

4.3 Provide evidence by submitting a screenshot image. *

4.3 - Cheryl B..png



4.3 OPTIONAL: Add remarks for your evidence.

minimal distractions, consistent design, clear labeling, and plenty of white space to aid with focusing only on the assignment

5.0 SOCIAL INTERACTION

Social interaction in a TSLE involves creating spaces for communication, collaboration, and knowledge-sharing among instructors and peers. It fosters active engagement, community building, and collective learning through synchronous and asynchronous methods (Koh, 2015).

Scoring Key for the Likert Scale:

- **1** Strongly Disagree = Found no evidence
- **2** Disagree = Found minimal evidence
- **3** Agree = Easily found evidence
- **4** Strongly Agree = Found an abundance of evidence

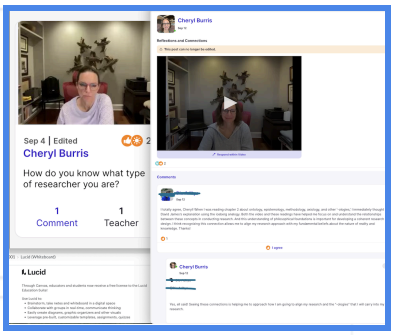
12/7/24, 10:24 PM TSLE Learning Design Principles Scale

5.1 TSLE facilitates collaborative learning experiences through group projects and peer discussions. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

5.1 Provide evidence by submitting a screenshot image. *

5.1 - Cheryl B..png



5.1 OPTIONAL: Add remarks for your evidence.

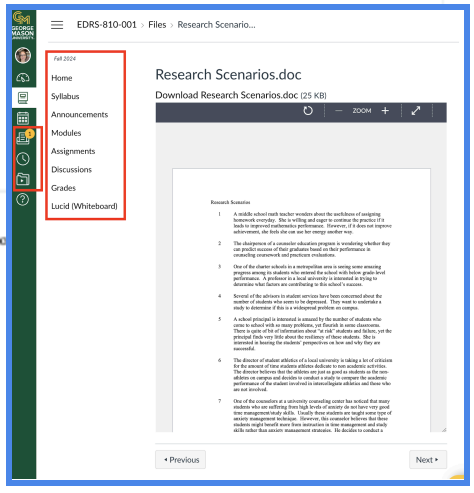
While lucid chart is offered, it is the only option for group collaborations and discussions.

5.2 TSLE incorporates asynchronous communication channels such as messages, forums, blogs, and recorded videos for flexible interactions. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

5.2 Provide evidence by submitting a screenshot image. *

5.2 - Cheryl B..png



https://docs.google.com/forms/d/1mN8E_xUEQKQnb8mUBbbBLDHU3L8bQ-BtsJ0II8oZmIE/edit#respo

5.2 OPTIONAL: Add remarks for your evidence.

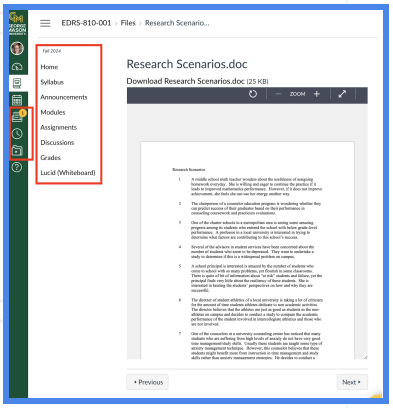
The only embedded asynchronous option the TSLE offers is email (see red boxes on the image).

5.3 TSLE includes synchronous tools like live chats, video conferencing, and shared screen options to support real-time collaboration. *

	1	2	3	4	
Strongly Disagree	◉	○	○	○	Strongly Agree

5.3 Provide evidence by submitting a screenshot image. *

5.3 - Cheryl B..png



5.3 OPTIONAL: Add remarks for your evidence.

No embedded synchronous options are offered by the TSLE (see red boxes on the image).

That was the last item.

Thank you for submitting your thoughts!

Appendix E

Completed by Zee: Technology Supported Learning Environment Scale Form

TSLE Learning Design Principles Scale

Use this form to evaluate the Canvas Course, *EDRS 810 - Problems and Methods In Education Research.*

Before you begin, who is submitting this form? *

Yueqing (Zee) Zhong

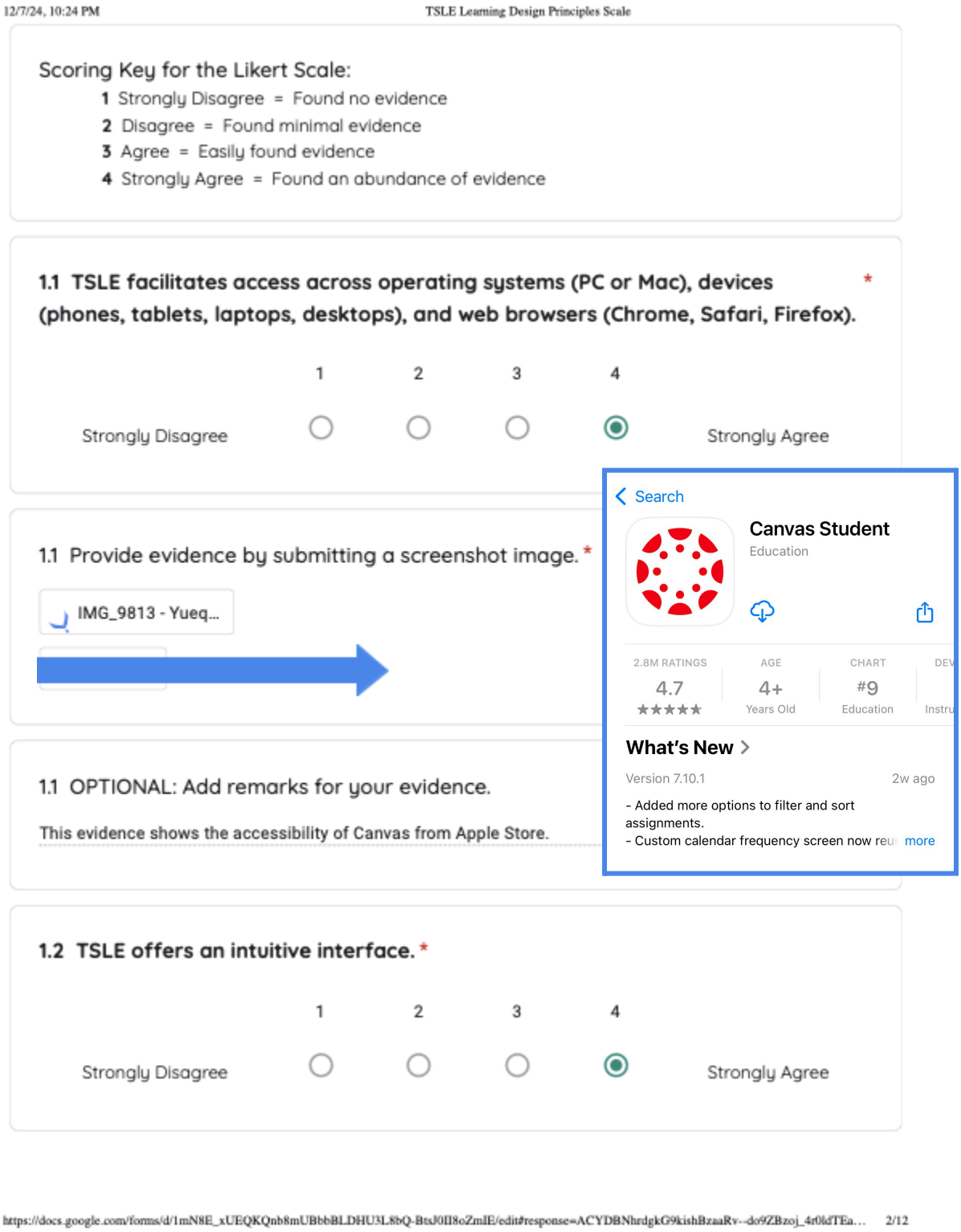
This is what you need to know before you begin:

> Please answer each question.
> Please upload one screenshot as evidence for each item.
> You can add optional remarks below the evidence.
> Here is a scoring key for the Likert scale:
    1 Strongly Disagree = Found no evidence
    2 Disagree = Found minimal evidence
    3 Agree = Easily found evidence
    4 Strongly Agree = Found an abundance of evidence

> OK - Ready to begin? ***Let's go!***

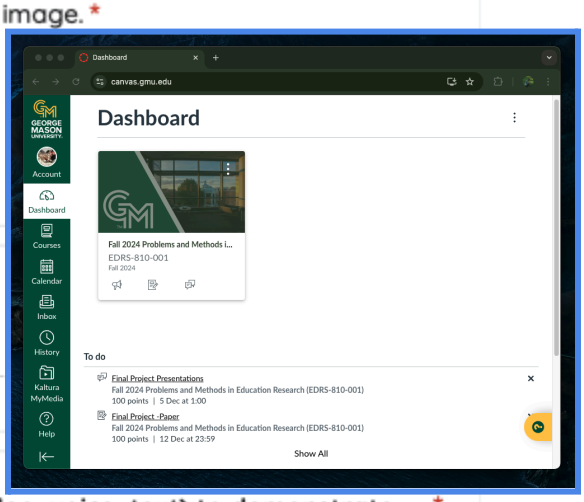
1.0 USABILITY

Usability is the "fulfillment of functional requirements... performance and well-being, mainly from the user's perspective" (Iwarsson & Stahl, 2003, p. 60). Additionally, it "...entails evaluating affordances of a technology platform but doing so from a lens of the activities and experiences that learners will engage in specifically in the system" Moore & Tillberg-Webb, 2023).


12/7/24, 10:24 PM
TSLE Learning Design Principles Scale
Scoring Key for the Likert Scale:
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence
1.1 TSLE facilitates access across operating systems (PC or Mac), devices (phones, tablets, laptops, desktops), and web browsers (Chrome, Safari, Firefox). *
1 2 3 4
Strongly Disagree
Strongly Agree
1.1 Provide evidence by submitting a screenshot image. *
IMG_9813 - Yueq...
1.1 OPTIONAL: Add remarks for your evidence.
This evidence shows the accessibility of Canvas from Apple Store.
Search
Canvas Student
Education
2.8M RATINGS
4.7
AGE
4+
Years Old
CHART
#9
Education
What's New
Version 7.10.1
2w ago
- Added more options to filter and sort assignments.
- Custom calendar frequency screen now reu
more
1.2 TSLE offers an intuitive interface. *
1 2 3 4
Strongly Disagree
Strongly Agree
https://docs.google.com/forms/d/1mN8E_xUEQKQnb8mUBbbBLDHU3L8bQ-BtsJ0II8oZmIE/edit#response=ACYDBNhrdgkG9kishBzaaRv--do9ZBzoj_4r0ldTEa... 2/12

1.2 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



1.2 OPTIONAL: Add remarks for your evidence.

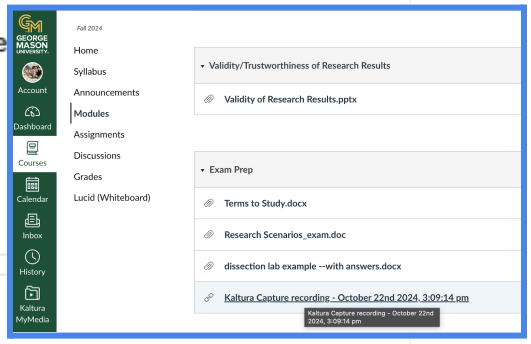
The interface is easy to access, read, and understand.

1.3 TSLE uses with a variety of applications (video, voice, text) to demonstrate learning. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

1.3 Provide evidence by submitting a screenshot image

Screenshot 2024...



1.3 OPTIONAL: Add remarks for your evidence.

This screenshot shows the Kaltura Capture recording material in assisting learning.

2.0 FEEDBACK

Feedback gives learners meaningful insights into their progress, helping refine learning strategies and improve outcomes. Technology facilitates this process by offering instant, personalized feedback and enabling peer-to-peer and instructor-to-learner communication (Hattie & Timperley, 2007; Allen, 2016).

Scoring Key for the Likert Scale:

1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

2.1 TSLE provides instant, automated, and personalized feedback to guide learners instantly. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

2.1 Provide evidence by submitting a screenshot image. *

Screenshot 2024...

2.1 OPTIONAL: Add remarks for your evidence.

This screenshot shows the homework feedback displayed on Canvas as soon as the instructor uploaded.

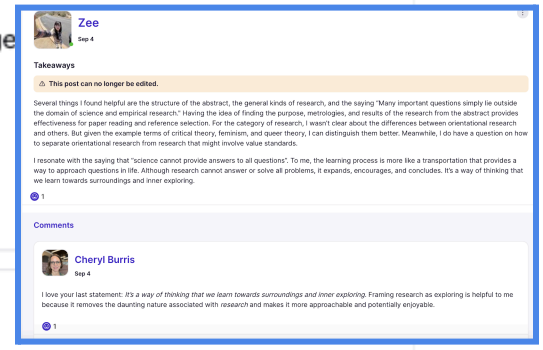
12/7/24, 10:24 PM TSLE Learning Design Principles Scale

2.2 TSLE enables peer-to-peer feedback through collaborative tools like shared documents, forums, or group assessments. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

2.2 Provide evidence by submitting a screenshot image

Screenshot 2024...



2.2 OPTIONAL: Add remarks for your evidence.

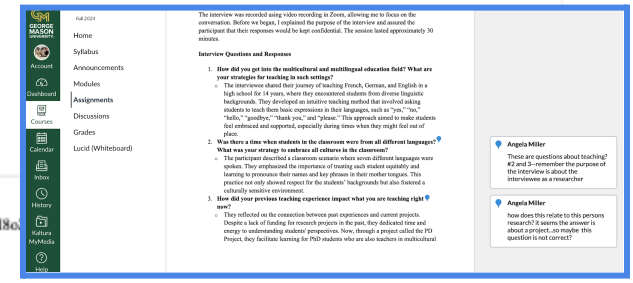
TSLE allows peer feedback and comment under posts to assist collaboration.

2.3 TSLE allows educators to provide structured, custom feedback on learner submissions. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

2.3 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



https://docs.google.com/forms/d/1mN8E_xUEQKQnb8mUBbbBLDHU3L8bQ-BtsJ0II8o

2.3 OPTIONAL: Add remarks for your evidence.

TSLE allows customized feedback from educator to Canvas users.

3.0 SCAFFOLDING

Scaffolding provides learners temporary support to accomplish tasks they cannot yet complete independently, using step-by-step guidance or adaptive technologies. This support decreases as learners gain competence, fostering independence (Wood, Bruner, & Ross, 1976; Rambe, 2012).

Scoring Key for the Likert Scale:

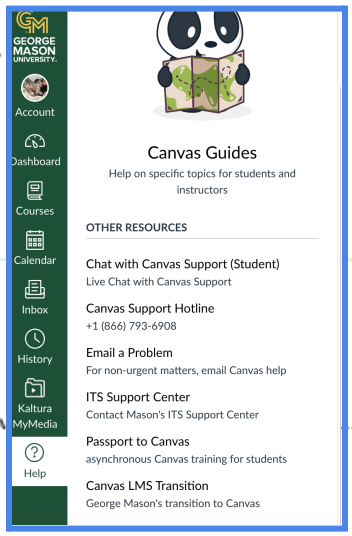
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

3.1 TSLE provides step-by-step guidance or prompts tailored to learners' current skill levels. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

3.1 Provide evidence by submitting a screenshot image.

Screenshot 2024...



3.1 OPTIONAL: Add remarks for your evidence.

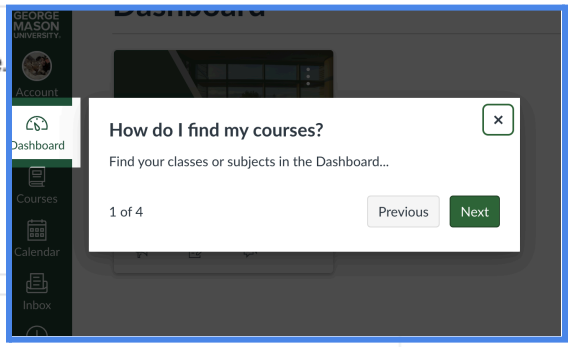
Canvas allow chat with technical support in learning and guidance.

3.2 TSLE offers self-assessment opportunities to evaluate their learning and provides review/refresher content for missed items. *

	1	2	3	4	
Strongly Disagree	○	◉	○	○	Strongly Agree

3.2 Provide evidence by submitting a screenshot image.

Screenshot 2024...



3.2 OPTIONAL: Add remarks for your evidence.

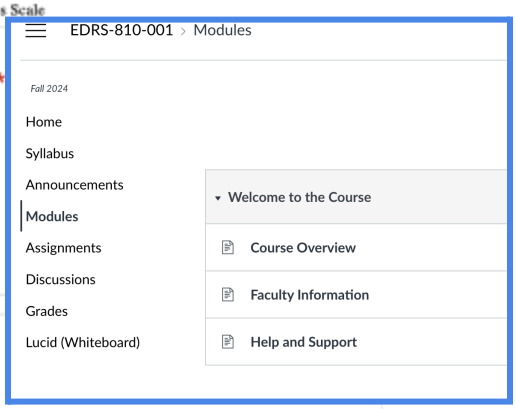
Adaptive learning tool is in learning Canvas instead of learning courses in Canvas.

3.3 TSLE offers tools (e.g., hints, models, examples, or templates) to aid learners in solving complex problems. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

3.3 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



3.3 OPTIONAL: Add remarks for your evidence.

In module session, TSLE allows instructors in posting tools (e.g., hints, models, examples, or templates) to aid learners in solving complex problems.

4.0 ACCESSIBILITY

Accessibility is a measurement of a user's ability to use products/services, the extent to and ease with which they can meet their goals. Designing with accessibility in mind enables people with a range of abilities and disabilities to perceive, understand, navigate, interact with, and contribute to the web (UX Magazine, 2020). In Learning Technology, accessibility involves features like text-to-speech or closed captioning to accommodate diverse learners (Seale, 2014).

Scoring Key for the Likert Scale:

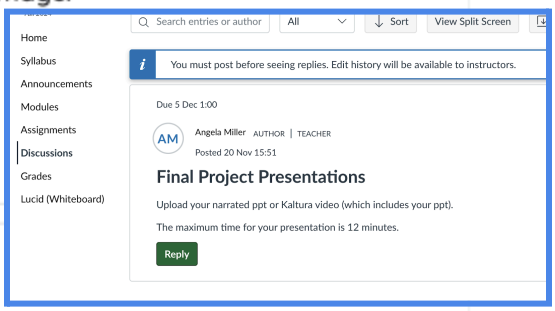
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

4.1 TSLE offers multiple ways to engage, represent, and express learning. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

4.1 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



4.1 OPTIONAL: Add remarks for your evidence.

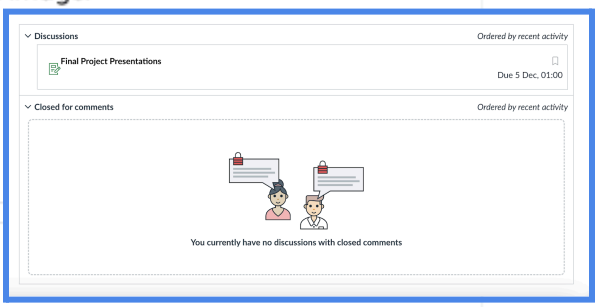
Comments are available in most sessions, the example shows the option in engagement based on instructor's teaching.

4.2 TSLE allows control of media. Some examples are video playback, turning on captioning, and increasing/decreasing the volume *

	1	2	3	4	
Strongly Disagree	◉	○	○	○	Strongly Agree

4.2 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



4.2 OPTIONAL: Add remarks for your evidence.

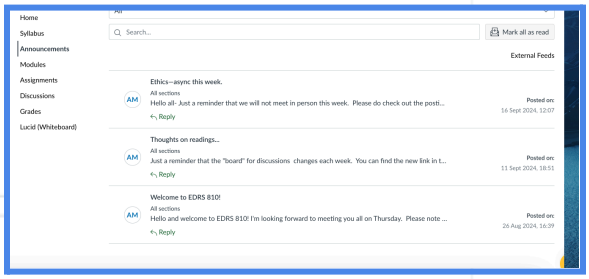
Students are required to engage if necessary, vice versa.

4.3 TSLE reduces cognitive load by using clear labeling, including white space, eliminating unnecessary text/visual elements, and employing a consistent hierarchy and navigation design. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

4.3 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



4.3 OPTIONAL: Add remarks for your evidence.

The announcement layout is easy and clear to read,

5.0 SOCIAL INTERACTION

Social interaction in a TSLE involves creating spaces for communication, collaboration, and knowledge-sharing among instructors and peers. It fosters active engagement, community building, and collective learning through synchronous and asynchronous methods (Koh, 2015).

Scoring Key for the Likert Scale:

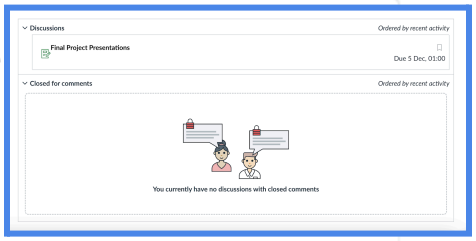
1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

5.1 TSLE facilitates collaborative learning experiences through group projects and peer discussions. *

	1	2	3	4	
Strongly Disagree	○	○	◉	○	Strongly Agree

5.1 Provide evidence by submitting a screenshot image.

Screenshot 2024...



5.1 OPTIONAL: Add remarks for your evidence.

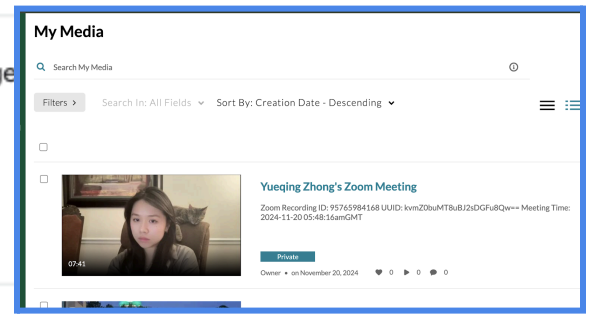
This application is accessible only if it's open to students.

5.2 TSLE incorporates asynchronous communication channels such as messages, forums, blogs, and recorded videos for flexible interactions. *

	1	2	3	4	
Strongly Disagree	○	○	○	◉	Strongly Agree

5.2 Provide evidence by submitting a screenshot image

Screenshot 2024...



5.2 OPTIONAL: Add remarks for your evidence.

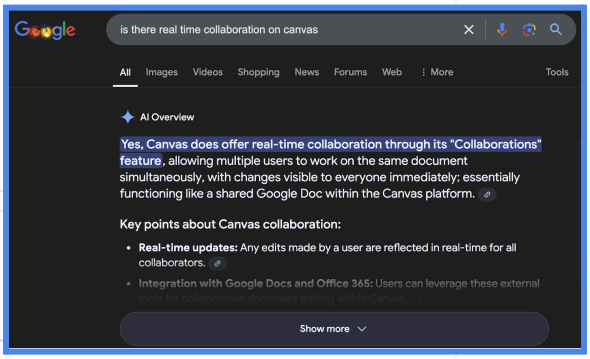
Students are re-watch the zoom recordings and review learning materials.

5.3 TSLE includes synchronous tools like live chats, video conferencing, and shared screen options to support real-time collaboration. *

	1	2	3	4	
Strongly Disagree	◉	○	○	○	Strongly Agree

5.3 Provide evidence by submitting a screenshot image. *

Screenshot 2024...



5.3 OPTIONAL: Add remarks for your evidence.

Not applicable from my Canvas although it seems available.

That was the last item.

Thank you for submitting your thoughts!

Appendix F

Blank: Technology Supported Learning Environment Scale Form

TSLE Learning Design Principles Scale

Use this form to evaluate the Canvas Course, *EDRS 810 - Problems and Methods In Education Research.*

* Indicates required question

1. Email *

2. Before you begin, who is submitting this form? *

Mark only one oval.

- ◯ Yueqing (Zee) Zhong
- ◯ Rachel Lugo
- ◯ Cheryl Burris

This is what you need to know before you begin:

> Please answer each question.
> Please upload one screenshot as evidence for each item.
> You can add optional remarks below the evidence.
> Here is a scoring key for the Likert scale:
    1 Strongly Disagree = Found no evidence
    2 Disagree = Found minimal evidence
    3 Agree = Easily found evidence
    4 Strongly Agree = Found an abundance of evidence

> OK - Ready to begin? ***Let's go!***

1.0 USABILITY

Usability is the "fulfillment of functional requirements... performance and well-being, mainly from the user's perspective" (Iwarsson & Stahl, 2003, p. 60). Additionally, it "...entails evaluating affordances of a technology platform but doing so from a lens of the activities and experiences that learners will engage in specifically in the system" Moore & Tillberg-Webb, 2023).

Scoring Key for the Likert Scale:

- **1** Strongly Disagree = Found no evidence
- **2** Disagree = Found minimal evidence
- **3** Agree = Easily found evidence
- **4** Strongly Agree = Found an abundance of evidence

3. **1.1 TSLE facilitates access across operating systems (PC or Mac), devices (phones, tablets, laptops, desktops), and web browsers (Chrome, Safari, Firefox).** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

4. 1.1 Provide evidence by submitting a screenshot image. *

Files submitted:

5. 1.1 OPTIONAL: Add remarks for your evidence.

6. **1.2 TSLE offers an intuitive interface.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

7. 1.2 Provide evidence by submitting a screenshot image. *

Files submitted:

8. 1.2 OPTIONAL: Add remarks for your evidence.

9. **1.3 TSLE uses with a variety of applications (video, voice, text) to demonstrate learning.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

10. 1.3 Provide evidence by submitting a screenshot image. *

Files submitted:

11. 1.3 OPTIONAL: Add remarks for your evidence.

2.0 FEEDBACK

Feedback gives learners meaningful insights into their progress, helping refine learning strategies and improve outcomes. Technology facilitates this process by offering instant, personalized feedback and enabling peer-to-peer and instructor-to-learner communication (Hattie & Timperley, 2007; Allen, 2016).

Scoring Key for the Likert Scale:

- **1** Strongly Disagree = Found no evidence
- **2** Disagree = Found minimal evidence
- **3** Agree = Easily found evidence
- **4** Strongly Agree = Found an abundance of evidence

12. **2.1 TSLE provides instant, automated, and personalized feedback to guide learners instantly.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

13. 2.1 Provide evidence by submitting a screenshot image. *

Files submitted:

14. 2.1 OPTIONAL: Add remarks for your evidence.

15. **2.2 TSLE enables peer-to-peer feedback through collaborative tools like shared documents, forums, or group assessments.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

16. 2.2 Provide evidence by submitting a screenshot image. *

Files submitted:

17. 2.2 OPTIONAL: Add remarks for your evidence.

18. **2.3 TSLE allows educators to provide structured, custom feedback on learner submissions.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

19. 2.3 Provide evidence by submitting a screenshot image. *

Files submitted:

20. 2.3 OPTIONAL: Add remarks for your evidence.

3.0 SCAFFOLDING

Scaffolding provides learners temporary support to accomplish tasks they cannot yet complete independently, using step-by-step guidance or adaptive technologies. This support decreases as learners gain competence, fostering independence (Wood, Bruner, & Ross, 1976; Rambe, 2012).

Scoring Key for the Likert Scale:

1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

21. **3.1 TSLE provides step-by-step guidance or prompts tailored to learners' current skill levels.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

22. 3.1 Provide evidence by submitting a screenshot image. *

Files submitted:

23. 3.1 OPTIONAL: Add remarks for your evidence.

24. **3.2 TSLE offers self-assessment opportunities to evaluate their learning and provides review/refresher content for missed items.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

25. 3.2 Provide evidence by submitting a screenshot image. *

Files submitted:

26. 3.2 OPTIONAL: Add remarks for your evidence.

27. **3.3 TSLE offers tools (e.g., hints, models, examples, or templates) to aid learners in solving complex problems.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

28. 3.3 Provide evidence by submitting a screenshot image. *

Files submitted:

29. 3.3 OPTIONAL: Add remarks for your evidence.

4.0 ACCESSIBILITY

Accessibility is a measurement of a user's ability to use products/services, the extent to and ease with which they can meet their goals. Designing with accessibility in mind enables people with a range of abilities and disabilities to perceive, understand, navigate, interact with, and contribute to the web (UX Magazine, 2020). In Learning Technology, accessibility involves features like text-to-speech or closed captioning to accommodate diverse learners (Seale, 2014).

Scoring Key for the Likert Scale:

1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

30. **4.1 TSLE offers multiple ways to engage, represent, and express learning.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

31. 4.1 Provide evidence by submitting a screenshot image. *

Files submitted:

32. 4.1 OPTIONAL: Add remarks for your evidence.

33. **4.2 TSLE allows control of media. Some examples are video playback, turning on captioning, and increasing/decreasing the volume** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

34. 4.2 Provide evidence by submitting a screenshot image. *

Files submitted:

35. 4.2 OPTIONAL: Add remarks for your evidence.

36. **4.3 TSLE reduces cognitive load by using clear labeling, including white space, eliminating unnecessary text/visual elements, and employing a consistent hierarchy and navigation design.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

37. 4.3 Provide evidence by submitting a screenshot image. *

Files submitted:

38. 4.3 OPTIONAL: Add remarks for your evidence.

5.0 SOCIAL INTERACTION

Social interaction in a TSLE involves creating spaces for communication, collaboration, and knowledge-sharing among instructors and peers. It fosters active engagement, community building, and collective learning through synchronous and asynchronous methods (Koh, 2015).

Scoring Key for the Likert Scale:

1 Strongly Disagree = Found no evidence
2 Disagree = Found minimal evidence
3 Agree = Easily found evidence
4 Strongly Agree = Found an abundance of evidence

39. **5.1 TSLE facilitates collaborative learning experiences through group projects and peer discussions.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

40. 5.1 Provide evidence by submitting a screenshot image. *

Files submitted:

41. 5.1 OPTIONAL: Add remarks for your evidence.

42. **5.2 TSLE incorporates asynchronous communication channels such as messages, forums, blogs, and recorded videos for flexible interactions.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

43. 5.2 Provide evidence by submitting a screenshot image. *

Files submitted:

44. 5.2 OPTIONAL: Add remarks for your evidence.

45. **5.3 TSLE includes synchronous tools like live chats, video conferencing, and shared screen options to support real-time collaboration.** *

Mark only one oval.

	1	2	3	4	
Stro	◯	◯	◯	◯	Strongly Agree

46. 5.3 Provide evidence by submitting a screenshot image. *

Files submitted:

47. 5.3 OPTIONAL: Add remarks for your evidence.

That was the last item.

Thank you for submitting your thoughts!