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Explaining the Fluency Gap for Native and Non-Native English Public Speakers

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Abstract: This study examines the "fluency gap" in public speaking between native (L1) and non-native (L2) English speakers through the lens of state anxiety, cognitive interference and mental effort. Employing an empirical design incorporating speech recordings, self-assessments, and audience evaluations, the research seeks to elucidate the cognitive-linguistic mechanisms underlying dysfluencies and inform pedagogical strategies for enhancing L2 public speaking proficiency.

Keywords: Fluency gap**,** State anxiety**,** Cognitive interference**,** Mental effort**,** Dysfluencies

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Introduction

Oral presentation skills are important to non-native English speakers (NNES or L2s), particularly for academic assignments in courses, such as the basic communication course, that require English as the language of instruction (Boyle, 1996). According to Chen and Chang (2009), NNES who have poor or limited command of English during classroom speaking performances experience threats to their self-image. This contributes to greater apprehension and psychological discomfort among L2 students (Dewaele & Shan Ip, 2013) that, in turn, has a negative impact on their academic achievement (Huang, 2014). Compared to their native English-speaking (NES or L1) counterparts, the speech delivery of L2s using English contains more dysfluencies (Guz, 2015). This so-called, “fluency gap” has been observed frequently in college-level courses anecdotally and in SLA, TESOL and applied linguistics literature formally but has not been adequately explained. One potentially fruitful approach would be to examine the fluency gap among L1 and L2 basic communication course students.

Theoretical Perspective

This project sought to explain why native English speakers (NESs or L1s) have fewer vocal dysfluencies than non-native English speakers (NNESs or L2s). In previous studies of applied linguistics and second language acquisition (SLA) this has been called "the fluency gap." Moreover, differences in L1 and L2 fluency have been recognized by international language education organizations, including TESOL or the Teaching of English to Speakers of Other Languages (www.TESOL.org). This project tests a general impairment model of vocal delivery in which state anxiety, cognitive interference (worrying), and mental effort explain the presence of dysfluencies in public speaking addresses.

Review of Literature

Speaker state anxiety has been associated with poor performance on public speaking assignments (Philipot, Vrielynck, & Muller, 2010) including classroom speeches (Dwyer & Cruz, 1998) and career tasks by recent college graduates (Powell, 2004). Among the aspects of speech delivery most impacted by state anxiety is vocal fluency. For example, Choi, Honeycutt, and Bodie (2015) reported that students with higher levels of speech anxiety displayed more vocal disruptions, pause more often and for longer durations than their counterparts with lower speech anxiety. The general explanation for this effect is that state anxiety activates worry cognitions like negative thoughts and worries, impaired attention and concentration and cognitive biases (Glassman, et al., 2014) that markedly increase demands on working memory thereby impairing fluency language use (Zohar, Livine, & Fine, 2003).

Humans continually monitor their speech for language errors and often repair them immediately when errors are detected. According to Hartsuiker (2007), this involves a stop signal that terminates an utterance, followed by a re-start signal to correct the utterance. The cycle of interrupting and then repairing recurs continually during communication with many corrections made before words are spoken aloud. This results in pauses between words, which are often long enough to be noticed by listeners, and filled pauses or vocal fillers, such as saying "uh," "um," and "okay" between utterances. In addition, interrupting and repairing at the same moment that words are spoken can result in mispronunciation, malapropisms and poor articulation. However, anxious individuals can, at times, compensate for the effects of state anxiety on memory-related tasks by exerting greater mental effort (Edwards, Edwards, & Lyvers, 2016; MacNamara & Proudfit, 2014).

Based on previous research, L2 speakers differ from L1s in state anxiety, worry and mental effort. That is, compared to native speakers of English, L2s will report higher levels of state anxiety (DeWaele & Shan Ip, 2013), worry more (Lopez, 2011), and exert greater mental effort (Révész, Michel, & Gilabert, 2016) during public speaking addresses. As a result, these differences could help scholars to explain and further examine the phenomenon of the fluency gap.

Hypotheses

Based on the preceding discussion, we advanced the following hypotheses:

> H1: There is a positive association between NNES or L2s speakers' self-monitoring and their vocal disfluencies during public speaking addresses.
>
> H2: There is a positive association between NNES or L2s speakers' repair and their vocal disfluencies during public speaking addresses.

Method

Participants

Participants in the study were (34 male, 46 female) undergraduate students enrolled in a basic, university level speech communication course. Five subjects did not complete all instruments used in the study and were eliminated from the data bearing pool of participants.

Procedures

All participants were assigned to prepare and present a five to six-minute informative speech to audiences composed of 20 classmates and the instructor. Speeches were performed for credit and were graded. Speaking order and day of presentation were assigned by random selection procedures. After speaking, participants filled out Spielberger's State-Trait Anxiety Inventory Questionnaire (Spielberger, Gorsuch, & Lushene, 1970) (STAI), the Cognitive Interference Questionnaire (CIQ) (Sarason, Pierce, & Sarason, 1996), and the mental effort sub scale of Reid and Nygren's (1988) Subjective Workload Assessment Test (SWAT). Speakers' vocal behaviors were observed by rating teams composed of five audience members who were not speaking that day. Assessments of communication-related anxiety were standard procedures in this course and students were so informed.

Instruments

Public speaking state anxiety was represented by scores on Spielberger's (Speilberger, Gorsuch, & Luschene, 1966) State-Trait Anxiety Inventory Questionnaire (STAI) focused on the confrontation public speaking milestone (Behnke & Sawyer, 1998). For example, instructions for the anticipation stage measurement were as follows:

> Circle the number to the right of each statement that best represents your agreement with it. Specifically, indicate how you felt during the first minute of your informative speech.

The STAI (A-State) measures transitory emotional responses to specific situations (Spielberger, 1983) and, in studies of public speaking state anxiety, has evidenced consistently high levels of reliability (Beatty & Behnke, 1991; Behnke & Carlile, 1971). Moreover, the STAI (A-State) has performed according to theoretical expectations in previous speech anxiety research (Behnke & Sawyer, 2000, 2001; Sawyer & Behnke, 1998; 1999). In the present study, the alpha reliability for the STAI (A-State) was .92.

Mental effort (ME) was defined by scores on the mental effort subscale of Reid and Nygren's (1988) Subjective Workload Assessment Technique (SWAT) referring to the four traditional public speaking milestones of anticipation, confrontation, adaptation and release. For example, for the confrontation milestone speakers rated the mental effort they expended during the first minute of the presentation as follows:

> 1 = Very little conscious effort was needed. Speaking was almost automatic, requiring little or no attention;
>
> 2 = Moderate conscious mental effort or concentration was required because of the complexity, unpredictability, or unfamiliarity of the assignment;
>
> 3 = Extensive mental effort and concentration were necessary.

This speaking assignment was a very complex activity that required my total attention. Ratings of mental effort for each milestone were summed to produce a single score. In previous studies of mental workload, the SWAT has yielded acceptable indices of reliability and validity (Cole & Reid, 1997; Colle & Reid, 1998; Schvaneveldt, Reid, Gomez, & Rice, 1998). In the present study, the alpha reliability for the ME subscale was .87.

Worry was defined as speaker self-reported scores on Sarason, Pierce, and Sarason's (1996) Cognitive Interference Questionnaire (CIQ) referring to public speaking. The CIQ (Sarason, Pierce, & Sarason, 1996) consists of 22 items, 21 of the scale items are 5-point semantic differential scales (never, once, a few times, often, very often). Sample CIQ items include, "I thought about how poorly I was doing," "I thought about how difficult it was to present this speech," and, "I thought about how much time I had left." The last CIQ item provides a global rating on a 7-point rating scale (1=Not at All to 7=Very Much) and asks respondents to indicate the degree to which they felt their minds wander during the speaking task. In previous empirical studies, the CIQ has consistently yielded acceptable levels of reliability and concurrent validity (Greene, Rucker, Zauss & Harris, 1998; Rathus, Reber, Manza, Kusher, 1994; Sud & Sud, 1998; Yee, Edmondson, Santoro, & Begg, 1996). In the present study the alpha reliability for the CIQ was .89.

Speaker vocal behaviors were measured by audience ratings of speakers' presentations on Lewin, McNeil, and Lipson's (1966) pause and verbal disfluencies rating (PVDR) instrument. All eight items used a 5-point semantic differential scale (never to very often). Interrater reliability for these rating teams, based on intraclass correlation (Ebel, 1951; Frick & Semmel, 1978) ranged from .85 to .93. We used the pauses and corrections subscales of the PVDR respectively to operationalize verbal self-monitoring and repair. The remaining items on the PVDR served as the measure of vocal disruptions during public speaking. That is, audiences observed mispronunciations, sentence fragments, repeated words, or phrases, filled pauses ("uh," "like," "you know") and nonverbal intrusions (coughing, laughing, sighs).

Results and Discussion

Means (with standard deviations in parentheses) for the CIQ, ME, STAI, verbal self-monitoring, repair and speaker disfluencies were 33.6 (7.4), 8.8 (2.21), 44.4 (13.26), 12.85 (2.43), 5.89 (1.39) and 2.75(.57), respectively.

We used a hierarchical multiple regression analysis to compare verbal self-monitoring and repair explanations for vocal disfluencies during public speaking addresses. The verbal self-monitoring and repair variables contributed 39.6% of the variance in verbal disfluencies during speech performance ($F_{6, 68}$=7.42, p<.05). Likewise, the change in R^2 was significant ($F_{2,68}$ = 19.793, p<.05, DR^2 = .352). Consequently, H_1 and H_2 were supported.

The findings of this study indicate that basic communication course speakers with vocal disfluencies during public speaking addresses are engaging in verbal self-monitoring and repair. Whether vocal disfluencies are associated with general impairment of cognitive control and thereby language is largely a matter of debate.

From a pedagogical perspective, previous research has identified possible strategies that instructors can use to strengthen a student's ability to handle task-interfering thoughts (Sarason & Sarason, 1990; Smith, 1996). For example, Sarason and Sarason (1990) found that reassuring and neutral instructions before taking a test aided the performance of those students who were more anxious. However, those same types of instructions did not aid low anxious students. Thus, a teacher would have to avoid a "one size fits all" approach in helping students overcome the detrimental effects of cognitive interference.

Other strategies that have been found to help high anxious students that report higher levels of worry include biofeedback, systematic desensitization, cognitive restructuring, mental rehearsal, refocusing techniques, modeling, social support, and relaxation training (Sarason & Sarason, 1990; Smith, 1996). Many of these strategies have resulted in the reduction of interfering and anxious thoughts. However, it is not known if those strategies also result in improved performance (Sarason & Sarason, 1990). Future research should examine these strategies to determine if a reduction in cognitive interference is associated with improved public speaking performance.

Basic course instructors frequently ask why vocal disfluencies occur and what should they do about them. Disfluencies, such as filled pauses (e.g., "huh," "uh," "like," "you know") or excessive pauses between thoughts, are utterances that the speakers unintentionally insert in their vocal delivery. Vocal disfluencies are normally not meaningful words, but speakers use them to fill the gaps in their speeches. Public speaking teachers have long recognized the problem of vocal disfluencies in students' oral presentations because they have detrimental effects on speech performance. Specifically, basic course instructors generally believe that filled pauses and other disfluencies cause audiences to disengage from effective listening, impair their comprehension of the message, and disrupt the flow and the tone of the speech. Controlling vocal disfluencies is important to students because the negative impact that disfluencies have on their presentation grades.

Basic course instructors often struggle with developing effective pedagogical methodologies to help students to reduce or eliminate their vocal disfluencies. In some cases, teacher have resorted to simply counting each speaker's disfluencies before grading the presentation, the higher the number of disfluencies, the lower the student's grade. However, the current research reveals that verbal disfluencies in public speaking have a much deeper theoretical foundation. Understanding the causes of vocal disfluencies can lead to pedagogical improvements, which can not only help the instructors to become more effective, but also help to improve the student's delivery and confidence. This will result in improved student satisfaction and effectiveness as well as improved teacher's instructional methodology.

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Canadian Press and American Presidential Campaign of 1908

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Abstract: In 1896 and 1900 the Canadian press was virtually unanimous in their hostility to William Jenning Bryan, the Democratic presidential candidate. When Bryan ran for a third time against Republican William Howard Taft, Bryan's policies alienated of the conservative business oriented Liberal and Conservative Party press in Canada. Canada's financial elite controlled most of the press and abhorred Bryan's political and economic radicalism. Most of the Canadian press looked at horror at the thought Americans might elect a radical that would encourage the growth of radicalism in Canada, especially in the Canadian West, beginning to stir with political movements resembling American populism and progressivism. However, in 1908, part of the Canadian press representing radical agrarians in western Canada, social reform Liberals, trade unionists, fundamentalist Protestants, and anti-Catholic Orange Order wanted a Bryan victory. This included the voice of western agrarians, Grain Grower's Guide, pro-labor Industrial Banner, social reform Liberals, like Windsor Record, Toronto Star, and Albert's Innisfail Free Lance, and the militantly anti-Catholic Protestant Order Toronto Sentinel. In addition, a number of newspapers feared Bryan less in 1908 and welcomed a victory by either Bryan or Taft. On the left, Canadian Socialist editors, like those of the Vancouver Western Clarion or the Winnipeg Voice, viewed both candidates as tools of the corporate elite and favored the American Socialist Eugene V. Debs.

Keywords: Canada, Bryan, 1908 Campaign, Canadian Press, Canadian public opinion.

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Introduction

In 1896 and 1900, the Canadian press was virtually unanimous in their hostility towards William Jennings Bryan, the Democratic presidential candidate. When Bryan ran for a third time in 1908 against Republican William Howard Taft, the Great Commoner campaigned for strong government regulation of big business and favoritism towards organized labor. These policies alienated the majority of conservative business oriented Liberal and Conservative Party editors who preferred the election of the more conservative Taft. Canada's financial elite controlled most of the press and abhorred Bryan's political and financial radicalism. Bryan's policies might indirectly challenge Canada's economic nationalism. Most of the Canadian press looked at horror at the thought that Americans might elect a radical who would influence the growth of political radicalism in Canada. Newspaper editors in Canada viewed Bryan as an erratic and quixotic radical who threatened the American economy and social structure. (Levine, 1965; Kazin, 2006).

However, unlike 1896 and 1900, part of the Canadian press, representing radical agrarians in western Canada, social reform Liberals, trade unionists, fundamentalist Protestants, and militantly anti-Catholic Protestants wanted Bryan to win. Newspapers representing western farmers---Grain Grower's Guide, trade unionists----Industrial Banner, social reform Liberals, like Windsor Record, Toronto Star, and Innisfail Free Lance, and anti-Catholic Protestants of the Orange Order---Toronto Sentinel and Orange Protestant favored the Great Commoner. In addition, a number of newspapers considered both Taft and Bryan acceptable and remained neutral. On the left, Canadian Socialist editors like those of Vancouver Western Clarion and Winnipeg Voice, viewed both men as tools of the corporate elite, and preferred the American socialist, Eugene V. Debs. (Robin, 1968)

Canadian press hostility lessened in 1908, and even many anti-Bryan Canadian editors commended Bryan's honesty, sincerity, and idealism while opposing his radical economic and political policies. The editor of the anti-Bryan Liberal Kingston Whig described Bryan's "personality…charming. He has an eloquence of tongue… unsurpassed, He has a wealth of thought that makes him an attractive figure anywhere in any position." A certain degree of ambivalence emerged in the Canadian press in 1908. The absence of free silver, populism, anti-imperialism, and anti-British diatribes, themes in Bryan's 1896 and 1900 campaigns lessened Canadian press hostility to Bryan in 1908. However, the majority of Canadian editors, like their American counterparts, still considered Bryan too radical. While not fearing Bryan, Canadian editors feared his election would upset the American and Canadian economies, hurt Canadian business interests, endanger the National Policy, and might encourage the growth of Canadian radical agrarians and trade unionists. In 1908, Canadian editors respected and admired Bryan, the moral reformer, but despised him as a social and political crusader. As historian James Page concluded, "Bryanism was incompatible with Canadianism." (Kingston *Whig*, 7 July 1908; Page., 1968, 199).

When the American election campaign began the Great Commoner appeared a far more familiar figure to most Canadians than the somewhat obscure William Howard Taft of the Republican Party. Only in Murray Bay, Quebec, where Taft had a summer home since 1892 was Taft well known and liked. "Taft was always a great man in Murray Bay," one of his biographers suggested. Local French Canadians loved and respected the "petit juge" as one of their own. Outside of Murray Bay, few Canadians knew of Taft until the 1908 presidential campaign began. (Pringle, 1939,123; Warner, 1908, 74).

While few Canadians knew about Taft the Canadian press viewed him as safe, sane, and conservative, a more responsible potential president than Bryan. Canada's financial elite controlled most the Canadian press. Many Canadian editors shared the same views as the financial elite. Paul Rutherford, historian of late nineteenth century Canadian journalism, concluded that the shared economic interests of the Liberal and Conservative press with the business community limited the independence of Canadian journalism. The Winnipeg Grain Growers' Guide, the voice of western Canadian agrarians, shared the same concerns: "The ownership of newspapers in Canada has become a sideline with politicians and capitalists and it is to suit the views of these people that the wells of truth have been defiled…in Canada the freedom of the press is gone completely." Voicing the sentiments of Canadian unions, London's Industrial Banner lamented "that our great dailies…are up for sale, and if you are willing to pay the price…their editorial columns are at your service." According to historian Ramsay Cook the success of

Canadian entrepreneurs in the early twentieth century created concentrated economic power in the hands of a few men, and "there was no movement of criticism directed against Canadian materialism comparable to the United States." The lack of muckraking journalism in Canada meant that most Liberal and Conservative editors and publishers did not sympathize with Bryan's reform agenda. They wished to avoid Yankee republican ideas and Bryan's perceived socio-economic radicalism crossing the 49th parallel. According to Cook there were only "small pockets of radicals and socialists" in Canada, and Bryan's election as president might encourage the growth of radicalism north of the border. (Winnipeg *Grain Grower's Guide*, 11 October 1910; Cook, 1963, 49; Rutherford, 1982, 205; *Industrial Banner*, October 1908; Cook, 1970, 164).

"In brief, everyone likes Bryan. In this country, his politics have no weight, His personality is everything…He is the biggest personality that ever-visited Canada." This description of the visit of Bryan to Toronto appeared in the Canadian Courier, an independent national weekly published in Toronto. The Great Commoner did something unusual for an American presidential candidate in the early twentieth century he left the United States to go on a speaking tour in Montreal and Toronto in February 1908. Canadians had an opportunity to see an American presidential candidate and found him a popular and well-known visitor to Canada. (*Canadian Courier*, 22 February 1908. 1).

"Judging from the expressions of satisfaction that have freely been spoken, it is safe to say that he came and saw and conquered…all favorably impressed his hearers and made his visit very popular." This account came from the Canadian Baptist, published in Toronto. Commending Bryan's speeches, Toronto's Presbyterian concluded that as a result of Bryan's visit the American presidential election "will be watched with an even keener and more sympathetic interest than in the past." When he spoke in Montreal, La Patrie reported "il s'assit au milieu d'un tonnerre d'appaudisswments." (he sat down in the middle of thunderous applause). Senator Raoul Dandurand, Speaker of the Canadian Senate, urged Bryan to go to Ottawa as a guest of the Senate. Representatives of several Canadian Irish societies met with Bryan and encouraged him to extend his stay and make a trip to Quebec. When he visited Toronto one of his speeches was before the Toronto Press Club, Joseph Clark, editor of the Toronto Saturday Night, later wrote to Bryan that "there were many in Canada who believed that your good influence on American political life was already much greater than that of many men who had occupied the presidency of the United States." As the American presidential campaign began Bryan was already a much better known and will liked American than Taft suggesting an elite-mass split may have developed in how Canadians perceived Bryan. (*Canadian Baptist*, 20 February 1908, 1; *Presbyterian*, 20 February 1908, 227; Montreal *La Patrie*, 11 February 1908, 6; Clark to Bryan, 6 November 1908, Bryan Papers; Clark to Bryan, 15 January 1909, Clark Papers).

Did interested Canadians want Bryan or Taft to win the American presidential election? According to the anti-Bryan Liberal Brantford Expositor many Canadians preferred a Bryan victory: "If Canadians had the determining of the matter Bryan would probably be elected." The Methodist Christian Guardian agreed," he has caught the popular fancy…Many Canadians, perhaps, the great majority of those interested would have liked to see Mr. Bryan win." According to the Presbyterian Witness of Pictou, Nova Scotia, "Bryan is a popular man in Canada as well as the United States." The anti-Bryan Toronto Saturday Night admitted that his February visit "made

Bryan some warm, Canadian friends." When their New York City correspondent visited Toronto in September he reported that he found "an impression that Bryan would be elected." Another anti-Bryan paper, Liberal Toronto Globe, admitted after the election that a majority of Canadians "would on personal grounds preferred Mr. Bryan." (Brantford *Expositor*, 3, 4 August, 2 November 1908, 4; *Christian Guardian*, 11 November 1908, 6; *Presbyterian Witness*, 13 July 1908, 229; *Saturday Night*, 23 September 1908., 5; *Globe*, 4 November 1908, 4).

During the 1908 election campaign period the image of Bryan held by Canadian editors underwent a partial change. The Bryan of 1896 was "crude in manner, untrained in diplomacy, and unbalanced in judgment" while the new Bryan of 1908, according to the ant-Bryan Liberal Calgary Herald, demonstrated "greater dignity, matured judgment" and appeared saner and more sensible. Some Canadian editors were impressed by Bryan's visit to Montreal and Toronto in February and saw a distinction between Bryan the moral reformer they could admire and Bryan the political radical they despised. While the extreme hostility towards Bryan expressed by the Canadian press in 1896 and 1900 lessened Bryan still represented a too radical alternative to most Canadian editors. As the independent Conservative Vancouver Province argued that Canadians "usually associate him with destructive theories and policies." (*Herald,* 16 July 1908, 2; *Province,* 30 October 1908, 6). Only a few Canadian newspapers approved of Bryan. The Grain Growers' Guide, published in Winnipeg and founded in June 1908, presented the most favorable image of Bryan in the Canadian press. Adopted by the Manitoba Grain Growers' Association, United Farmers of Alberta, and Grain Growers' Association of Saskatchewan it became the voice of western Canadian agrarian radicalism and "the most widely read periodical in the prairie West." Its editors and staff shared the same concerns about the concentration of wealth and the exploitation of western farmers by predatory interests. The paper's staff had an intense faith in direct democracy. They described Bryan as "a champion of the people." To the Guide, Bryan was a great agrarian democrat and champion of the people. He "sympathized with the needy rather than the greedy." Bryan wanted to prevent "the idle rich from combining for the more complete absorption of the fruits of labor of others." These views represented the concerns of western Canadian farmers who expressed ideas similar to the American Populists and Progressives. By 1914 925,000 Americans settled in western Canada. Between 1897-1920 a million and a quarter Americans immigrated to western Canada who came from the American prairie states and endorsed the same sets of reforms north of the border. Former Americans rose to leadership positions in the farmers' movements in Alberta and Saskatchewan. Historian A. Ross McCormack noted "the ease with which men and ideas moved across the border." Much to the chagrin of the Canadian press, Yankee republican ideas infected western Canada from Manitoba to British Columbia. According to David Smith: "The concerns of Progressivism…were also evident in the councils of the organized farmers of Saskatchewan." Historian W. L. Morton considered the American progressive movement's "influence as immediate and insistent on the growth of the reform movement in the Canadian West." (*Grain Grower's Guide,* November 1908, 23; McCormack, 1991, 19; Smith, 1975, 76, 72; Morton, 1950, 11-19; Lipset, 1968, 62-7; Sharp, 1971, 4-5).

A Canadian farmer poet summed up the American influence in western Canada:

> For the Yankees in the land abound
> For Uncle Sam gets all around.

And with his push and grit and go
Is sure to make the country grow.

To some western radicals, like John McIntosh, editor of the Innisfail *Free Lance* (Alberta), Bryan and the Democratic Party stood for "popular government…directly guided by the toiling masses" while the Republican Party "believes in…minority rule." Linking the Liberal Party to the Democratic Party, McIntosh argued that both championed the common man. McIntosh was the only Liberal Party editor in western Canada to make the connection. Another Alberta paper, independent Calgary News, believed "Mr. Bryan is a democrat at heart and so is Mr. Gompers. Neither is ultra-radical although certain high finances would have the public believe so." Bryan's election would ensure control of the trusts which high financiers feared. For some western radicals Bryan and the Democratic Party represented the vanguard of the common man's struggle against the plutocrats, but in western Canada only three newspapers favored Bryan over Taft. Even the supposedly reform minded and leading advocate for western Canada in the Liberal Party, Winnipeg Free Press, edited by reformer John Dafoe preferred Taft. The ferment for reform in western Canada suggested far more sympathy for Bryan than Taft proving an elite mass split between newspaper editors and the people of western Canada. (*Free Lance,* 6 August 1908, 2; *Grain Gower's Guide,* 20 September 1911, 8; Sharp, 1971, 10; Moose Jaw *Times,* 24 July 1908, 4).

While "the Progressive movement…seemed to cause few repercussions north of the border" in eastern Canada progressive reform probably influenced two Liberal Party editors in Ontario who favored Bryan---Windsor Record and the Toronto Star. Bryan's attack on predatory wealth appealed to the two editors. As early as February, the previously anti-Bryan Liberal Star endorsed Bryan, "another Roosevelt…[who] seems what the United States needs right now." To Joseph Atkinson, editor of the Star, Taft was a "man of mediocre personality," [while Bryan] "is a man in the class of Roosevelt, not the class of Taft." Bryan was a great popular leader, a man in his own right, not a cheap imitation like Taft. "He shines with no borrowed light," declared the Star. (Spaulding, 1950, 266' Toronto *Star,* 21 February 1908,4; Underhill, 1961; Harkness, 1963).

Archibald McNee, editor of the Liberal Windsor Record, believed Bryan ranked far above Taft, a "modern William the Gross." To McNee Bryan was the great agitator for social and political reform. In his opinion, "such a man would adorn the position of chief executive of the United States." McNee disagreed with Atkinson that Roosevelt was the greatest living American, rather Bryan was the "great prototype." The retirement of Roosevelt dismayed Atkinson, but not McNee who saw Bryan as a better standard bearer for progressive reform. McNee was the most aggressive supporter of progressive reform among newspaper editors in eastern Canada. (Windsor *Record,* 30 June 1908; Toronto *Star,* 24 July 1908, 4)

Both Atkinson and McNee shared Bryan's concern about plutocracy. Atkinson praised the Democratic platform of 1908 especially Bryan's call for publicity of campaign contributions. The Toronto editor warned that corporations wielded an unhealthy influence on Canadian politics leading to "government through the people for the corporations." McNee went after the Republican platform as a jumble of doubletalk and viewed the Republicans as an arm of the "interests that are exploiting and bleeding the Democracy." According to McNee the Democratic platform “appeals not only to common sense but to common justice.” This platform leads “to the emancipation of the American and Canadian people from the bondage of economic privilege.” McNee urged every Canadian to read the Democratic platform “as the same causes are operating on this side of the boundary.” While predatory wealth as not quite as bad in Canada as in the United States “special privilege in all forms increases its sinister influence annually in Ottawa.” Atkinson and McNee cautioned that the “great barbecue” of predatory wealth corrupting American society had begun to corrupt Canadian political life as well. (Toronto *Star,* 24 July 1908, 4; Windsor *Record,* 25 June, 4, 11 July 1908; Harkness, 1963; Spaulding, 1954).

Bryan’s criticism of predatory wealth and his support for unions appealed to the London, Ontario Industrial Banner, the official voice of the Trades and Labor Congress of Canada. The Industrial Banner denounced American workingmen who favored Taft, the candidate of the union busting National Association of Manufacturers. Canadian trade unionists wanted Bryan to bury Taft. “As far as Canadian trade unionists are concerned, they hoped to see Taft snowed under,” because Taft was the man of the trusts and the corporations while Bryan stood for the common man and unions. Non-socialist unionists in Canada supported Bryan as strongly as Canadian business interests favored Taft. (*Industrial Banner,* August 1908, 4; Robin, 1968).

The Great Commoner’s advocacy of the common man appealed to Horatio Hocken, editor of the Toronto Sentinel and Orange Protestant Advocate and future mayor of Toronto. Hocken argued, “Bryan impresses the average man as an honest high-minded citizen who will do the best to govern the country in the interests of the plain people.” Anti-Catholicism played a major role Hocken’s support for Bryan since he considered Taft, Unitarian, soft on Catholicism and he viewed “the Republican Party is the more favorable to the schemes of the Church.” Although Bryan was not anti-Catholic, he identified with fundamentalist Protestant religious values making him far more acceptable to the militant Orange Order and anti-Catholic Hocken. The Orange Order played a significant political role in Toronto, the Belfast of Canada, and Hocken represented the important militant Protestant section of the population. Bryan appealed to Hocken because while he advocated political radicalism, he adamantly supported conservative Protestantism. (Toronto *Sentinel,* 29 October 1908, 1; Jenkins, 2013).

Another somewhat odd supporter of Bryan was the independent “enlightened Tory” Conservative Toronto Telegram. The paper considered his nomination a victory for a “great man unaided by the patronage of office, great or small.” Bryan was a man of “fine character, high purpose, noble aims,” and feared Canadians would not admire a man who was not tied to the rich and powerful. To the Telegram, Bryan represented the kind of political leader they wanted to see in Canada as well as the United States. In fact, the Telegram even went as far as to defend Bryan against the attacks of a Toronto Congregationalist minister, Rev. B.H. Stauffer, who charged Bryan with lack of morality and hypocrisy in a Buffalo newspaper because Tammany endorsed Bryan. The sincere, dedicated, and idealistic Bryan stood out above the crowd of scheming, opportunistic, and corrupt politicians dominating Canadian and American politics. The Telegram considered Bryan a better and more moral man than Taft. (Toronto *Telegram* 9 July, 10, 19, 29,1908).

While Bryan's supporters in the press viewed him as the spokesperson for the common man and the leading critic of predatory wealth's influence in American politics this did not impress Canadian socialists. To the socialist press, like Vancouver Western Clarion, Winnipeg Voice, and Cowansville Observer (Quebec) there was little difference between the two candidates. They only saw Eugene V. Debs, the presidential candidate of the American Socialist Party, sympathetically. "The two Bills are writing the same dope speeches," announced the Voice. The two men are misleading the American public because according to the Observer "the Republican and Democratic parties are trust controlled." After the election, Western Clarion satirized the American voters for their stupidity in electing Taft since his election would not help the workingman. Contrary to the mainstream Liberal and Conservative press and Canada's financial elite American radicalism reached Canada. Eugene V. Debs played a significant role in the growth of socialism in British Columbia and western Canada. Historian A. Ross McCormack noted "the significant and increasing influence of American socialists on the BC movement." Seymour Lipset also observed that supporters of Debs influenced the growth of socialism in Saskatchewan. Militant socialist Daniel de Leon, leader of the more extreme New York City based Socialist Labor Party, influenced the growth of more militant socialism in British Columbia and western Canada. The emergence of the even more radical International Workers of the World (Wobblies) in western Canada "demonstrated the ease with which men and ideas moved across the forty-ninth parallel," as Big Bill Haywood, Joe Hill, and Frank Little spread American radicalism to western Canada. Socialists in Canada viewed Debs rather than Bryan as their hero and supported his candidacy for the American presidency. Winnipeg *Voice,* 24 July 1908,3, 30 October 1908, 4; *Cowansville Observer,*8 October 1908, 1; Vancouver *Western Clarion,* 7 November 1908, 2; McCormack 1991,24; Lipset, 1968, 43).

Mainstream Canadian Press

The mainstream Canadian press reprinted three series of articles from the American press during the presidential campaign. Glowing articles about Taft, especially a series written by Lyman Abbott, editor of the pro-Taft Outlook magazine appeared most often in the Canadian press. A pro-Bryan series rarely appeared in Canada. The papers most hostile to Bryan printed a series of anti-Bryan articles. However, the Canadian press, Liberal, Conservative, and independent preferred to build up the image of Taft as the more worthy candidate for the presidency, and the articles by Abbott created the image Canadian editors wanted to present about the American election.

Canadian editors made frequent use of election forecasts from the American press. They were frequently anti-Bryan and predicted a Taft victory. Articles and editorials from the anti-Bryan New York Herald appeared most often in Canada. Anti-Bryan editorials and election forecasts from New York Post and Brooklyn Eagle found an audience in the Canadian press as did anti-Bryan material from Boston and Philadelphia newspapers. Many Canadian papers also printed the less partisan accounts by William Wellman of the Chicago Record-Herald. The vast majority of Canadian editors avoided pro-Bryan articles, editorials or forecasts. Most Canadian newspapers covering the American election predicted a Taft victory. (Kazin, 2006).

"Canadian opinion, as expressed in the newspapers runs strongly to Taft," accurately reported the Liberal Saint John Telegraph of New Brunswick. Most Canadian editors not only wanted a Taft victory they expected it.

According to the Liberal Regina Leader in Saskatchewan, “there appears every indication that Mr. Taft and not Mr. Bryan will be the next occupant of the White House.” Another Liberal paper, Saint John Globe, in New Brunswick considered “a victory for Mr. Taft is a foregone conclusion.” Up in the Yukon, the Liberal Whitehorse Star expected a Taft landslide, and Bryan “does not stand a ghost of a chance.” Of course, the Conservative Party press agreed. According to the Vancouver News-Advertiser we “look for the election of Mr. Taft.” The editor of the Toronto *Mail and Empire* argued that “Mr. Taft seems as certain as President Roosevelt appeared in July 1904. (Saint John *Telegraph,* 29 October 1908, 4; Regina *Leader,* 2 November 1908, 4; Saint John *Globe,* 10 July 1908, 4; *Whitehorse Star,* 10 July 1908, 1; Vancouver *News-Advertiser,* 12 July 1908, 4; Toronto *Mail and Empire,* 17 July 1908, 6).

A few Canadian newspapers were less certain of the outcome. In Alberta, the Conservative Edmonton Journal concluded that “the verdict will be impossible to say with certitude.” According to the Conservative London Free Press, in Ontario, the outcome looked “more and more like an even question.” To the independent Liberal French language La Presse, of Montreal, the silent vote remained the key. “le vote silencieux…rend impossibles tous calcus serieux et consciencieux.” The pro-Bryan Toronto Star thought the race was close but “Bryan may win.” One newspaper accurately analyzed part of the reason for the pro-Taft predictions. The Liberal Halifax Acadian Recorder noted that most of the Canadian press depended on the anti-Bryan New York and New England newspapers for stories about the election. (Edmonton *Journal,* 3 November 1008, 2; London *Free Press,* 30 October 1908, 4; *La Presse,* 2 November 1908, 4; Toronto *Star,* 31 October 1908, 4; Halifax *Acadian Recorder,* 13 July 1908, 2).

In 1896 and 1900 the Canadian press was virtually unanimous in its hatred for Bryan, a dangerous radical, but Bryan seemed less of a threat for some anti-Bryan newspapers in 1908. Some Canadian newspapers contended that both Taft and Bryan were acceptable to Canadians. To the Presbyterian Witness, of Pictou. Nova Scotia, American electors “have the privilege of a good man whatever their party affinity.” To some editors, both men were of high moral character. For the independent Conservative Ottawa Journal, “both men are estimable personalities either will be quite satisfactory as head executive of the neighboring republic.” Canada need not worry about the outcome of the election. As the anti-Bryan Toronto Farmer’s Sun observed, “seldom has there been a Presidential election…in which all outsiders have had less cause to await the outcome with uneasiness.” Whether Bryan or Taft won the United States was assured a competent leader “respected abroad” and according to the Presbyterian of Toronto, “it is pleasant for outsiders and neighbors to be able to say so much.” (Presbyterian *Witness*, 13 July 1908, 229; Ottawa *Journal,* 20 June 1908, 4; Toronto *Farmer’s Sun,* 14 October 1908, 1; *Presbyterian,* 25 June 1908, 804-05).

The Liberal Toronto Globe praised both candidates. Reverend James A Macdonald, a Presbyterian minister, social reformer, stump speaker and friend of Bryan served as editor, but he did not endorse Bryan, Instead, the Globe considered both candidates acceptable to Canadians. “Whatever happens at the November election the United States” will have “a creditable Chief Magistrate.” Macdonald noted that Bryan’s February visit had won the respect of the Canadian people. The independent Liberal Montreal Herald also praised both men and particularly supported Bryan's attack on predatory wealth, a rarity in the Canadian press. The independent Canadian Courier of Toronto also endorsed Bryan's attack on predatory wealth and saw Bryan "as honest. Sincere, single-minded champion of popular rights." While admiring Bryan the journal felt either Taft or Bryan would make a good president and a good neighbor for Canada. (Toronto *Globe,* 24 June 1908, 4; Montreal *Herald,* 16 July 1908, 4; *Canadian Courier,* 27 June 1908, 8; Calgary *Herald;* 1908; *Christian Guardian,* 1908; Halifax *Acadian Recorder,* 1908; Quebec *Le Soleil,* 1908; Kamloops *Inland Sentinel,* 1908; Toronto *Busy Man's Magazine,* 1909).

Several newspapers that opposed Bryan's election and favored Taft could still find positive things to say about Bryan or defended him from Republican attacks. Again, this was fundamentally different from 1896 and 1900 because for most anti-Bryan and pro-Taft newspapers Bryan no longer appeared a threat to Canada. For the Liberal Moose Jaw Times (Saskatchewan) reprinting an article "Bryan the Genuine" from the American periodical, Public, suggested the paper made a distinction between Bryan the man, and Bryan the radical politician. Another Saskatchewan paper, Liberal Saskatoon Phoenix noted that Bryan "is placing the issues before the audiences in such a luminous way." Another Liberal Party paper, Regina Leader concluded that "Mr. Bryan is appealing to the man who thinks. Mr. Bryan is more moderate in his language." Repeating the same theme, the Conservative Victoria Colonist felt that Bryan "has become more sober in his judgment of policies." When the Republicans argued that Bryan's election would prevent a return to prosperity from the recession of 1907 the Liberal Saint John Globe denounced the Republican charge because it "conveys the impression of unfairness." The Liberal Brantford Expositor agreed "as Canadians we were made familiar with this kind of talk prior to the general election of 1896" when Conservatives used this cry against the Liberal Party. (Moose Jaw *Times,* 21 July 1908, 2; Saskatoon *Phoenix,* 29 July 1908, 2; Regina *Leader,* 24 August 1908, 4; Victoria *Daily Colonist,* 10 July 1908, 4; Saint John *Globe,* 20 October 1908, 4; *Brantford* Expositor, 1 August 1908, 4).

Image of Taft and Issues

The anti-Bryan press felt it necessary to build up the image of Taft for their readers. Liberals and Conservatives outdid one another, in a remarkable show of unanimity, in doing homage to Big Bill Taft. From the West, the leading voice of the Liberal Party, Winnipeg Free Press and its editor John W. Dafoe, considered Taft an "excellent candidate." Taft got the blessing of the most important newspaper in western Canada. Conservatives agreed as Vancouver News-Observer told its readers, "the selection of Mr. Taft, gives the Republican Party…a candidates worthy of its tradition." From eastern Canada the French language Liberal La Presse of Montreal concluded that the Republican Party found a strong candidate in Taft. ---"la parti republican ira a la bataille avec un candidat Populaire et fort." The Liberal Saint John Telegraph viewed Taft as "genial and able, a sane man.' For the Liberal Ottawa Free Press, Taft was the "strongest man available." According to the Liberal London Advertiser, Taft was a "big brained, big-bodied man with a fund of experience qualifying him" for the presidency. (Winnipeg *Free Press,* 19 June 1908, 4; Vancouver *News-Advertiser* 19 June 1908, 4' Montreal *La Press,* 19 June 1908, 4; Saint John *Telegraph,* 17 June 1908, 4; Ottawa *Free Press,* 10 June 1908, 4; London Advertiser, 19 June 1909, 4).

Other Canadian newspapers joined in to praise the virtues of Taft. For the Conservative Ottawa Citizen, Taft preferred mature, prudent, reasonable, and mellow policies. According to the Conservative Montreal Gazette, Taft had “ability, personal popularity, and an honorable record.” Another Conservative paper, Hamilton Spectator reminded its readers that Taft because his great abilities has proven successful in all his endeavors. Comparing Bryan and Taft: “It is impossible to think that Mr. Bryan has Mr. Taft’s qualifications for the Presidency,” argued Conservative Toronto News. As the Conservative News pointed out, “to the great multitude of people, who are sick to death of the literature of exposure…and shouting of social crusaders and industrial agitators,” Taft would be a more responsible, sane, and conservative choice. The Montreal Gazette relished a potential Taft victory that would end “paternal meddling with men’s business enterprise.” Liberal Party papers preferred Taft and limited conservative reform measures in the United States while Conservative Party newspapers believed Taft’s election would forestall the drift towards socialism a Bryan victory would represent. (Ottawa *Citizen,* 7 August 1908, 6; Montral *Gazette,* 19 July 1908. 8; Hamilton *Spectator,* 19 June 1908, 6; Toronto *News,* 11 July 1908, 4; Montreal *Gazette,* 13 July 1908, 8).

The Canadian press did not deal extensively with the issues of the 1908 American presidential campaign but generally attacked Bryan’s campaign platform. Bryan’s advocacy of a guarantee of bank deposits raised a firestorm in Canada. Attacking this idea, the Conservative Toronto Mail and Empire, argued that the proposal “would also impress the more critical as a crude and unscientific proposal.” Another Conservative paper, Toronto News, considered the plan “unsound, illogical, immoral, and impracticable.” From the other end of Canada Vancouver Province believed “whether bank deposits guaranteeing be good or bad, Mr. Bryan’s indorsement does not recommend it.” Several other newspapers made a point of suggesting the folly of this idea. Even so-called intellectuals, Professors W.W. Swanson and James Cappon, from Queen’s University in Kingston, denounced the bank deposits idea as unwise and dangerous. (Toronto *Mail and Empire,* 11 July 1908, 16; Toronto *News,* 19 July 1908, 6; Vancouver *Province,* 27 October 1908, 5; Montral *Witness,* 1908; Sherbrooke *Record,* 1908; Swanson, 1908; Cappon, 1908).

Another proposal, Bryan’s pro-labor anti-injunction plank thrilled the Canadian Trades and Labor Congress but earned Bryan the venom of the mainstream Liberal and Conservative press. The Conservative Ottawa Citizen denounced it as irresponsible and recommended Taft’s “reasonable attitude towards capital and labor.” Agreeing the Liberal Saint John Telegraph considered Bryan’s proposal a bid for labor’s support “at the expense of sound public policy.” To Canadian editors both the bank and injunction issues appeared too radical and reinforced their belief that Taft would make a sounder president. (Ottawa *Citizen,* 7 August 1908, 6; Saint John *Telegraph,* 31 July 1908, 40.

These policies reinforced the image for some editors that Bryan was an unstable, erratic, and quixotic political leader. For the independent Montreal Witness, while Bryan “was vulgarly popular he did not know what was wise.’ To the Conservative Ottawa Citizen, Americans should not vote for Bryan, “whose somewhat kaleidoscopic views include everything from 16:1 silver to high tariff.” Similarly, the Conservative Toronto News complained about his “general instability of political character.’ According to the Conservative Vancouver Province, “Mr.

Bryan indeed never retracts," but goes from one issue to another but fails to stick to them. Liberal newspapers agreed. Kingston Whig concluded, "he has been tried in the balance and found wanting." For the Saint John Telegraph, Bryan was a man of unsound ideas. In the opinion of Saint John Globe, like Conservative Party leader R. L. Borden, Bryan lacked the "moderation of judgment. "Bryan's instability could endanger the industrial peace and commercial prosperity of the United States, and by implication Canada. The presidency was no place for a man of rash, vacillating, unsound, and impractical beliefs.(Montral *Witness,* 2 November 1908, 4; Ottawa *Citizen,* 2 November 1908, 6; Toronto *News,* 11 July 1908. 6; Vancouver *Province,* 27 October 1908, 6; Kingston *Whig,* 19 July 1908, 4; Saint John *Telegraph,* 10 July 1908, 4; Saint John *Globe,* 2 November 1908, 4).

Bryan's economic and political instability would hopefully have a negative impact on his chances. The Conservative Guelph Mercury expected a Bryan defeat because the American people preferred a man of sound judgment, Taft, rather than one who appeals to emotions and is erratic. The Victoria Times emphasized Bryan's "erratic public career." From Vancouver the independent Conservative Province criticized the Democrats for nominating a candidate "whose public history is one of disaster." Across the continent, in New Brunswick, the Liberal Saint John Globe wondered how the Democrats could be so foolish to nominate Bryan instead of a saner and more conservative candidate like former President Grover Cleveland. Again, questioning the wisdom of the Democrats, the Liberal Kingston Whig, asked, "is it Bryan only?" (Guelph *Mercury,* 2 November 1908, 2; Victoria *Times,* 26 June 1908, 2; Vancouver *Province,* 8 July 1908, 4; Saint John *Globe,* 13 July 1908, 4; Kingston *Whig,* 7 July 1908, 4),

Critiques of Bryan came from at least two other directions. Some of the press could not forget free silver. Toronto *Mail and Empire*, one of Canada's leading Conservative papers, viewed Taft and the Republicans "is as sound as it was when it was fighting Bryan's 16---1 policy.' Another Conservative newspaper, Montreal *Star*, questioned the sanity of the Democrats for nominating Bryan because of his 16-1 free silver proposal of 1896 "must always be 'suspect' in the matter of sound leadership." A couple of anti-Bryan newspapers went even further than the norm of 1908. To the Conservative Kingston *Standard*, it could not believe the American people had "given themselves up to the radicalism and demagogism of as to elect Bryan." Similarly, the Liberal Saint John *Telegraph* denounced Bryan as a revolutionist and demagogue out to destroy the existing social order. Although many Canadian editors viewed Bryan as far less threatening than 1896 or 1900 to some Conservative and Liberal Party editors Bryan remained a fiery radical who promoted pernicious Yankee radical ideas. (Toronto *Mail and Empire,* 20 June 1908, 6; Montreal *Star*, 13 August 1908, 4; Kingston *Standard,* 11 July 1908, 4; Saint John *Telegraph,* 31 July 1908, 4).

There emerged in 1908 a degree of ambivalence in the anti-Bryan press that did not really exist in 1896 or 1900. Some papers mixed kind words with sharp and severe criticism. The strongly anti-Bryan Kingston Standard, admitted "while we have no love for William J. Bryan…candor compels the statement that not infrequently he has the happy faculty of driving home a truth in a forcible and convincing manner." Another Conservative paper, Hamilton Spectator, praised Taft and Bryan as "men of unimpeachable character.' Even the Conservative Toronto News considered Bryan "a man of singular purity of character, eloquent, picturesque, attractive, and lovable."

According to the Liberal Kingston Whig, Bryan was a "man of many parts, versatile, able, genial, conciliatory.' The Liberal Regina Leader, expressed it best:

> Study William J. Bryan. It doesn't matter whether you're a Liberal
> Or a Conservative, a Democrat, or a Republican…or a Socialist…
> Bryan is a man, of whom it may be said he has never known defeat.
> For his sort of manhood can't be defeated. And it's the sort Canada.
> As well as the United States needs right now.

Conclusion

During the American presidential campaign of 1908, the Canadian press was not as unanimous in hostility to Bryan as in 1896 and 1900. Bryan found a receptive audience in western agrarians, like the editors of the Grain Growers' Guide and Innisfail Free Lance, who shared a desire for reform and to protect Canadian farmers from similar problems faced by American grain farmers. Much to the chagrin of the Canadian financial elite, American progressivism influenced western Canadians, especially since so many Americans settled in western Canada between 1897-1920. Canadian unionists in the Canadian Trades and Labor Congress favored Bryan, the champion of the working man. In eastern Canada, the social reform Liberals who edited the Windsor Record and Toronto Star identified with Bryan's attack on predatory wealth. Ironically, that also won him the support of the Conservative Toronto Telegram and independent Calgary News. A combination of his appeal to the common man and his fundamentalist Protestantism earned him the endorsement of Horatio Hocken and militantly anti-Catholic Toronto Sentinel. Bryan, the champion of reform, did not spark support from the Socialist press, like Western Clarion, who believed Bryan was too timid a reformer and preferred the Socialist, Eugene V. Debs. Contrary to the wishes of the Canadian financial elite and mainstream Conservative and Liberal Party newspaper editors and publishers Yankee radical ideas crossed the border, especially in British Columbia, Alberta, and Saskatchewan. In western Canada only three newspapers favored Bryan suggesting an elite mass split in attitudes between the majority of western Canadians and the views of the newspaper editors and publishers. So many Americans settled in western Canada, especially Alberta and Saskatchewan, that there was a second base of support for Bryan, because many had supported the Populists and Progressives.

The anti-Bryan Canadian press partially split in 1908. No longer fearing the radicalism of Bryan and viewing him as a more moderate candidate part of the press found both Bryan and Taft acceptable to Canadians. They believed the Canadians had nothing to fear from either candidate since neither would damage Canada's economic interests. The vast majority of Canadian newspapers favored Taft over Bryan because they viewed him as a safe, sane, and conservative alternative to the erratic and radical Bryan, an advocate of unacceptable ideas, like the guarantee of bank deposits and limiting the use of injunctions in labor disputes. Canadian editors identified with the plutocrats rather than the populists. Some Liberals wondered if a Bryan victory would put pressure on Laurier to live up to promises to lower tariffs, a desire of western Canadians, which would endanger the Canadian National Policy and anger members of the financial elite. Bryan's economic proposals in 1908 did not appeal to the conservative business-oriented Conservative and Liberal Party editors and publishers.

While Canadian editor preferred a Taft victory they were not as fanatically anti-Bryan as in 1896 and 1900. The most obvious newspaper voices of the business community, such as the Industrial Canada, Monetary Times, and Financial Post, refrained from tirades against Bryan. Negative images in the Canadian press was reinforced by the reliance on the anti-Bryan American newspapers in New York and New England that allowed the Canadian press to use American sources in their criticism of Bryan and support for Taft. However, the nomination of Bryan was not used as a symbol of the terrible nature of American society and politics, the way the image of Bryan was used in 1896 and 1900. Instead, in 1908, when dealing with the image of American social instability Canadian editors focused on the Springfield race riot, the degenerate nature of the immigrants entering the United States, and widespread crime south of the border. As the Conservative Montreal Star observed, "Bryan is no longer seriously feared for his radicalism." According to the Conservative Hamilton Spectator, Bryan's relative moderation impressed Canadians, and he had "grown in the estimation of the better classes." Furthermore, the Liberal Saint John Globe reported that Bryan "is a man whose mind is under the domination of his reason." In 1908 many of the anti-Bryan newspapers recognized positive qualities about Bryan while still favoring the sane and sensible Taft. (Montral *Star,* 26 October 1908, 4; Hamilton *Spectator,* 9 July 1908, 4; Saint John *Globe,* 20 October 1908, 4; Kingston *Standard,* 11 July 1908, 4; Toronto *Mail and Empire,* 10 July 1908. 16; Choquette, 6 and 8 November 1908; St. Hilaire, 9 November 1909, 4; Saint John *Sun,* 11 November 1908, 5).

Bryan did something unusual for an American presidential candidate he visited Canada at the beginning of his campaign and made two more trips to Canada after his third defeat in 1908. The American Consul-General in Winnipeg, Dr. J. Jones, asked Bryan to visit Winnipeg in February 1908 but waited until May 1909 to go on a speaking tour of Manitoba, while visiting Winnipeg, Grain Grower's Guide, paid tribute to the Commoner: "Bryan's influence is not circumscribed by the limitations of the American republic…Canada welcomes her guest and is grateful for his coming." Even the anti-Bryan press praised Bryan, Conservative Winnipeg Telegram noted that "Canadian public…esteem his as a man…worthy of every great office he has sought." People from many small towns in Manitoba rushed to see Bryan speak in Brandon. If Bryan's fame had spread to Boissevain, Hamiota, Wawanesa, Elgin, Virden, Hartney, and Headingly it is safe to say that Bryan was a well-known and popular in western Canada. (Portage *La Prairie Weekly Review,* 19 February 1908, 9; Winnipeg *Garin Grower's Guide,* May 1909, 55; Winnipeg *Telegram,* 6 May 1909, 4; *Commoner,* 14 May 1909, 11; Brandon *Sun,* 5 May 1909, 1; *Hamiota Echo,* 13 May 1909, 4; Elgin *Banner,* 12 May 2909, 4; Wawanesa *Independent,* 13 May 1909, 6; Boissevain *Recorder,* 13 May 1909, 1).

Bryan followed by an extensive tour of western Canada in October 1909 giving twenty-six speeches to 15,000 Canadians in western Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. In the opinion of the Regina Standard, "Mr. Bryan's reception was as hearty as might have been expected were he visiting a party stronghold in the United States." Calgary Albertan made the same observation about Bryan's popularity. According to the Edmonton Bulletin, Bryan "made another conquest and will ever be a welcome visitor to this city." Bryan was a popular and well-liked personality in western Canada even if the western press favored Taft over Bryan in 1908. As indicated earlier there was an elite mass split in attitudes in Canada, especially western Canada between the public and the editors of Canadian newspapers. (Regina *Standard,* 22 October 1909, 3; Calgary *Albertan,* 23 October 1909; *Commoner,* 12 November 1909, 16; Edmonton *Bulletin,* 19 October 1909, 9; Regina *Leader,* 23 October 1909, 4, Strum, 1983; Yorkton *Enterprise,* October 1909).

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Web Education Platform for Endangered Languages

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Abstract: Language extinction threatens over 1,500 languages by the end of this century. Melodic Transcription in Language Documentation and Analysis (MeTILDA) is a web-based toolset designed to document and educate endangered pitch-accent languages, where pitch variations alter word meaning. While MeTILDA effectively visualizes pitch movements using a novel perceptual scale, its educational features are limited. This paper presents an extension of MeTILDA with a Content Management System (CMS) that enhances language learning through course management, lessons, discussions, assignments, quizzes, and grading. Supporting listening, speaking, reading, and writing, the system integrates MeTILDA's pitch visualization tool to reinforce auditory perception. Built on MeTILDA's cloud-based architecture, this extension transforms it from a documentation tool into a comprehensive educational platform, aiding in the preservation of endangered languages.

Keywords: Language Preservation, Pitch-Accent Languages, Educational Technology, Speech Visualization, MeTILDA.

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Introduction

Language extinction is an urgent and growing concern in the era of globalization. Research suggests that over 1,500 languages will become extinct by the year 2100, leading to profound cultural and historical losses (**Bromham vd. 2022)**. Language is an integral part of cultural identity and heritage, and its disappearance erases not only linguistic diversity, but also historical knowledge embedded in textual and oral traditions. Furthermore, language extinction can have adverse effects on individuals within affected communities, potentially causing psychological trauma due to the loss of a cultural medium for communication and self-recognition (Low vd. 2022). Given these implications, preserving endangered languages is a critical endeavor.

Advancements in information technology present new opportunities for mitigating language extinction. Technologies such as Natural Language Processing (NLP), machine translation, and speech recognition have been explored as means of documentation, revitalization, and education for endangered languages. However, many existing technological solutions primarily serve researchers rather than language communities. This paper presents an innovative approach that extends the educational functionality of the Melodic Transcription in Language Documentation and Analysis (MeTILDA) system developed in our prior studies (Chen vd. 2021), enhancing its capabilities for community-based learning and language preservation.

Background

Information technologies play a crucial role in language preservation. Researchers have developed NLP tools to revitalize endangered languages (Zhang vd. 2022), bilingual dictionary construction methods leveraging WordNet and machine translation (Chen vd. (2021), and chatbot-based educational tools for teaching languages such as Irish (Chiaráin & Ní Chasaide 2016). Additionally, speech recognition techniques have been employed for language documentation (Foley vd. 2018). Despite these efforts, challenges remain in making these technologies accessible and effective for language learners and community members (Anastasopoulos vd. 2020). The MeTILDA system was developed in our previous work as a documentation and education platform for endangered languages with pitch-accent characteristics (Chen vd. 2021).

It employs a novel approach by integrating Western music formulas for pitch visualization, making tonal variations more intuitive for learners. Technologically, MeTILDA operates as a web-based application incorporating Firebase Authentication, a React frontend, a Python Flask Web Server, and integration with tools such as Praat (Boersma 2001) and ELAN (Sloetjes & Wittenburg 2008). While MeTILDA provides robust documentation capabilities, its educational functions remain limited to basic vocabulary learning and syllable-based pronunciation guidance. Expanding its educational capabilities would significantly enhance its impact on endangered language revitalization efforts.

Related Work

Existing solutions for endangered language education typically focus on documentation rather than comprehensive learning experiences. For example, some projects have leveraged NLP and speech recognition for linguistic analysis, but they lack structured learning environments that support interactive education. This gap highlights the need for a more holistic solution that integrates documentation with functional educational tools, thereby making language learning more accessible to community members rather than just researchers Liu vd. 2022). In our previous work, MeTILDA system has been developed to document and analyze pitch-accent languages by providing a novel form of pitch visualization (Chen vd. 2021).

The system enables the automatic generation of pitch art from audio files, offering a unique way to illustrate pitch variations that may not be easily perceptible in spoken form. This visual representation of pitch movements is particularly valuable for teaching tonal languages, where incorrect pitch patterns can lead to misinterpretations.

However, it does not fully support all aspects of language education—such as listening, speaking, reading, and writing.

To address these limitations, this project extends the MeTILDA system into a full-fledged web-based educational platform for endangered languages. The expanded platform integrates a Content Management System (CMS) that enables instructors to create and organize educational content while providing learners with interactive features to develop language proficiency.

Introduction

The proposed system extends the MeTILDA platform [8] by integrating a structured learning environment with interactive educational tools. Designed to support endangered language education, the system follows a **web-based architecture** that leverages modern cloud technologies for scalability and accessibility.

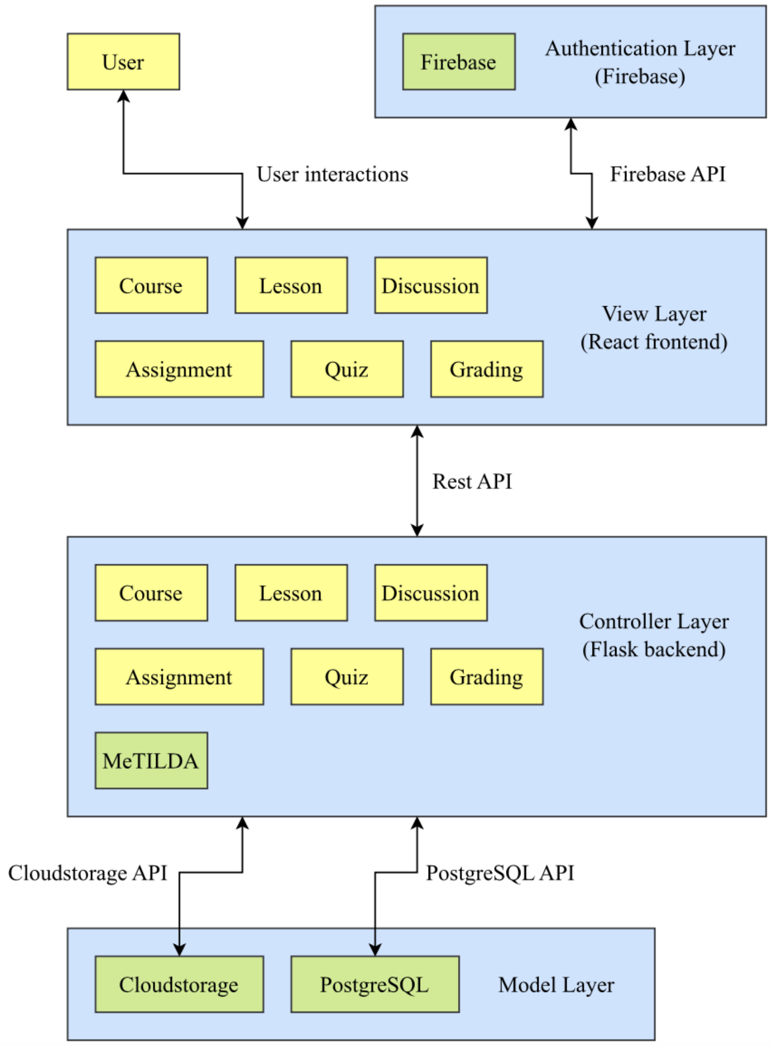

Figure 1. System Architecture

As shown in Figure 1, the system is developed using the **Model-View-Controller (MVC) pattern,** ensuring a clear separation between data management, user interactions, and application logic. The system is built on a **React frontend** and a **Flask backend**, integrating Firebase **for authentication, data storage, and multimedia content management.** The selection of these technologies is based on their compatibility with MeTILDA, ease of development, and community support. The system's functionalities include **role-based content management, lesson structuring, interactive learning modules, and assessment tools** with the following key enhancements: **User Role Management:** Differentiated views and functionalities based on user roles (teachers, students, administrators).

Course and Lesson Structuring: Courses comprise multiple lessons, which in turn consist of modular lesson blocks containing multimedia content.

Enhanced Educational Features: Support for listening, speaking, reading, and writing exercises through interactive text, images, audio, and video materials.

Integration of Pitch Art: The MeTILDA pitch visualization tool is embedded into lesson modules to aid in learning tonal aspects of languages.

Assessment and Feedback Tools: The CMS includes discussion forums, assignments, quizzes, and grading functionalities to facilitate a structured learning process.

Content Management System

The Content Management System (CMS) governs user authentication, content access control, and role-based functionality. Authentication is handled through Firebase, where users log in with credentials verified against stored authentication records. Upon successful login, authentication status is maintained in the React frontend using Context API. The backend processes user role verification and enforces access control based on database-stored permissions. Unauthorized users are redirected to the login page, ensuring data security and role-based content access.

User roles include linguistic **researchers, teachers, and students**, with administrative roles managed separately. New teacher and administrator accounts require verification by an existing administrator to prevent unauthorized access. This hierarchical authentication structure maintains system integrity and ensures well-defined user permissions.

Course Subsystem

Courses serve as the primary containers for educational content. Teachers can create and manage courses, each uniquely identified by a course number. Course visibility follows an availability-based access model, where unpublished courses remain hidden from students. The backend ensures uniqueness of course identifiers and enforces access constraints.

Lesson Subsystem

As shown in Figure 2, lessons are structured as modular content blocks, supporting **text, images, files, audio, and video elements.** The **React Draft WYSIWYG editor** facilitates rich text formatting, while Firebase Storage handles multimedia uploads. Lesson content follows a **hierarchical data model,** where lessons contain multiple lesson blocks in a **one-to-many** relationship.

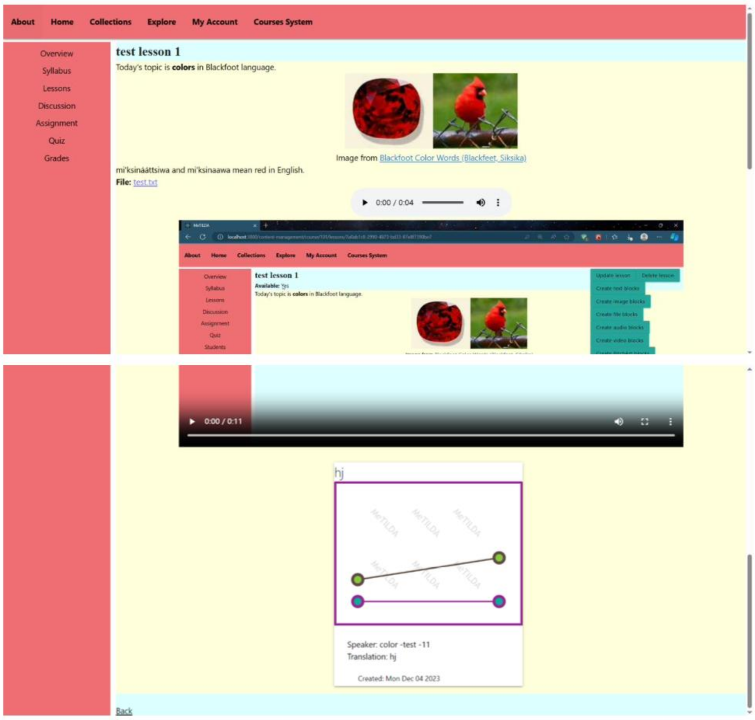

Figure 2. Example Lesson View

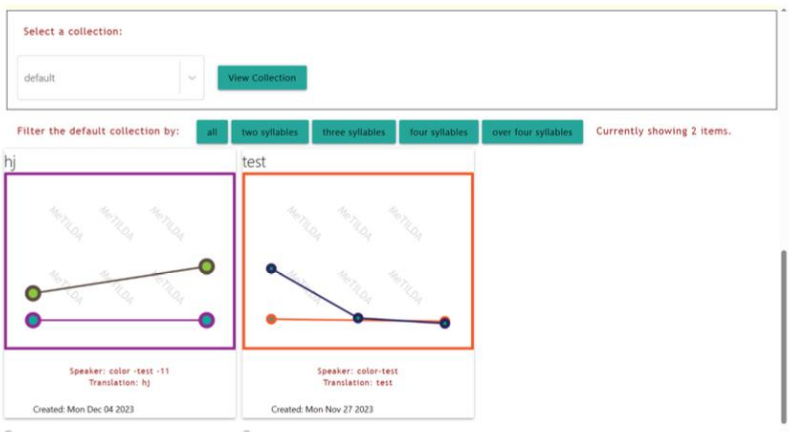

Figure 3. Pitch Art Selection

Additionally, a **pitch art block** is integrated, allowing teachers to link phonetic pitch representations from the MeTILDA system as shown in Figure 3. This feature enhances language learning through visual pitch contour representations, supporting phonetic analysis and auditory reinforcement.

Discussion Subsystem

The discussion forum enables structured peer interaction while enforcing access control based on user roles. As shown in Table 1, teachers and students can participate, but **only teachers and administrators can create discussion topics.** This restriction mitigates topic redundancy and ensures academic relevance.

Table 1. Discussion responsibility and rights

Role	Discussion Involvement	Right of creating topics	Right of reading topics, creating and reading posts and replies	Right of updating and deleting topic, posts and replies
Student	Yes	No	Yes	No
Teacher	Yes	Yes	Yes	No
Administrator	No	Yes	Yes	Yes

Posts and replies follow a **threaded structure**, supporting pagination for improved scalability. Time synchronization across time zones is standardized to UTC, ensuring consistency in discussion timestamps.

Assignment Subsystem

The assignment system facilitates **text-based responses and file submissions,** with version control ensuring that the latest submission replaces prior ones. Submission timestamps are recorded server-side to prevent time manipulation, ensuring fairness across global users.

Teacher View: Teachers manage assignments, set deadlines, and assign weighted grading factors. The weight of assignments influences the final course grade, with constraints ensuring that cumulative weights align with grading policies.

Student View: Students view assignment details, submit responses, and track previous submissions. The system dynamically updates submission records, ensuring seamless tracking of academic progress.

Quiz Subsystem

The quiz system supports **multiple-choice and speech-recording questions,** with strict start and end-time constraints. A **state machine-based logic** governs quiz access, preventing responses beyond the deadline while allowing students to review past attempts.

Teacher View: Teachers create quizzes, define question order through a drag-and-drop interface, and manage deadlines. Multiple-choice questions are **automatically graded,** while speech responses require manual evaluation.

Student View: Students receive real-time status updates when submitting responses, ensuring data integrity. Audio responses are recorded and uploaded to Firebase Storage, with a trial limit enforced to regulate attempts.

Grading Subsystem

The grading system aggregates scores from assignments, quizzes, and other assessments. Grading is role-dependent, where teachers assign scores and students access them post-evaluation.

Teacher View: Teachers review submissions, assign grades, and provide feedback. Multiple-choice quizzes are auto-graded, while speech responses require manual assessment via a built-in audio player.

Student View: Students access graded results with statistical insights, including mean scores and standard deviations. Quiz scores remain hidden until the deadline passes, ensuring assessment integrity. The backend manages visibility restrictions, preventing unauthorized access before grading completion.

Experimental and Analysis

Accessibility and Best Practice Evaluation

The accessibility and best practice evaluations were conducted using the Google Lighthouse development tool. Google Lighthouse is a widely used tool that provides automated audits for web applications, assessing accessibility, best practices, and overall performance. The accessibility audit ensures the application meets usability standards for diverse users, while the best practice audit verifies compliance with modern web development guidelines.

Table 2. Accessibility Test and Best Practice Test Scores

Subsystem	Accessibility	Best Practice
Course	100	100
Lesson	100	95
Discussion	93	100
Assignment	100	100
Quiz	100	100
Grades	100	100

The accessibility test measures usability aspects such as component size scalability, color contrast ratio, and language support. High accessibility scores indicate a user-friendly interface accommodating diverse users, including those with disabilities. As shown in Table 2, all subsystems demonstrated strong accessibility compliance. The Discussion subsystem scored slightly lower due to an issue with the third-party Draft.js package, which does not fully meet accessibility standards. However, this does not impact the core functionality of the system.

The best practice evaluation measures adherence to web development standards, including HTTPS usage, permissions management, and responsive design. The best practice issue identified in the Lesson subsystem pertains to responsive image handling for mobile devices. Since the current implementation is optimized for desktop use, this issue is expected to be resolved in future iterations.

Load Testing

The backend load test was conducted using the Locust test tool, a widely used Python-based load testing framework. The test focused on evaluating the system's performance under high user loads, specifically targeting API requests for reading content, as this is the most frequent operation in an educational platform. The test simulated up to 1000 concurrent users, increasing in increments of 10 users per second. The primary metric assessed was average response time, with stability indicating scalability and reliability under peak usage conditions. As can be seen in Table 3, the results indicate that the backend maintains a stable response time under increasing load, demonstrating scalability and readiness for large user bases.

Table 3. Accessibility Test and Best Practice Test Scores

Subsystem	Average Response Time (ms)	Is the pattern flat and stable?
Course	287.58	Yes
Lesson	285.51	Yes
Discussion	289.75	Yes
Assignment	288.08	Yes
Quiz	280.06	Yes
Grades	309.78	Yes

Conclusions

This study presents the development and evaluation of a cloud-based web platform for endangered language education. The platform integrates with the MeTILDA project, enabling pitch visualization for pitch-accented languages while supporting key educational functionalities such as course and lesson organization, assignments, discussions, quizzes, and grading. Additionally, it provides comprehensive multimedia support for listening, speaking, reading, and writing skills. The evaluation results confirm that the platform achieves high accessibility, best practice compliance, and backend scalability. The system's modular architecture ensures extensibility, maintainability, and ease of testing while maintaining robust security measures. Overall, the platform demonstrates its potential as a scalable and effective solution for language education in an online setting.

In our future work, deeper integration with MeTILDA components presents an opportunity for expanding the platform's capabilities. The current implementation leverages MeTILDA for basic functionalities, but further development could explore novel ways to enhance language learning through additional visualization and interaction features. Addressing these future enhancements will further solidify the platform's role in supporting endangered language education.

Acknowledgments

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Educators' Perspectives on Supporting Gender Diversity in the Classroom through a Culture of CARE

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Abstract: LGBTQ+ youth have been the target of much controversy lately in mainstream media and American politics. There are currently over 500 pieces of legislation attacking the rights of LGBTQ+ people in the United States. Attacks on diversity, equity, and inclusion efforts in secondary and higher education spaces have increased significantly with growing conservative leadership in American politics that mirrors the intersectional turmoil for LGBTQ+ people. The authors of this article examine how their teaching and research have evolved in relation to gender identity and provide strategies to encourage educators to challenge traditional binary expectations of gender in educational settings. Their *Culture of CARE* sets the groundwork for establishing inclusive and nurturing environments for all queer and gender-diverse individuals. The acronym *CARE* stands for Compassion, Awareness, Respect, and Empathy, and each stage of the framework is developed with tangible examples of how it can be applied in practice. The authors' ethnographic perspective provides details for the framework and offers actionable steps educators can implement to provide culturally relevant support for LGBTQ+ individuals in K-20 schools. Adopting and implementing a *Culture of CARE* would enhance the psychological, social-emotional, and environmental well-being of LGBTQ+ individuals in schools, promoting equitable and inclusive practices that support all.

Keywords: Gender Diversity, Culture Of CARE, Education, LGBTQ+

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Introduction

There has been a noticeable uptick in attention paid to gender diversity in education. People are discussing names, pronouns, restroom access, and changing facilities for physical education and sports teams, and many seem to have strong opinions about how these topics should be addressed. There have been significant challenges for

LGBTQ+ students, faculty, and staff in schools across the United States due to the contentious political climate and inflammatory legislation targeting this population (Anti-Defamation League, 2023).

For more than a decade, the National School Climate Survey (Kosciw et al., 2022) has consistently reported that, of their LGB peers, transgender students generally experience the most hostile school climates. These students are more likely to skip school, reporting lower levels of mental well-being. Minority stress and the stigma of being queer lead to increased negative health outcomes for this population of youth including substance abuse (Johns et al., 2019). However, having at least one supportive adult in the school environment can increase feelings of well-being at school and reduce the chances of dropping out. Although 96.3% of LGBTQ+ students can identify at least one such adult, only 10% reported that adults intervened when they experienced bullying and discrimination. Even more concerning is the fact that homophobic remarks and negative comments about gender expression, specifically from teachers and school staff, have increased from 2019 to 2021 and are markedly higher than in the years prior (Kosciw et al., 2022).

There is clearly room for growth. Most importantly, the National School Climate Survey (Kosciw et al., 2022) indicated that many schools fail to provide sufficient support for LGBTQ+ youth. Numerous factors may contribute to this inadequacy, including the school's geographical location, student demographic, school type (i.e., private/public/parochial), lack of comprehensive school policies protecting queer youth, or a general misunderstanding of how staff can support gender-diverse student populations.

Educators who identify as gender-diverse are already doing the work, albeit at a personal emotional cost (Rice, 2024). They focus on the well-being of their students by attending or presenting professional development training, educating their colleagues through ongoing and supportive conversations, advocating for gender-diverse students and staff in and outside of professional spaces, designing curriculum, and facilitating class discussions that challenge binary expectations about gender. Rice (2024) described these educators as brave because they relentlessly agree to advise student-organized Gender & Sexuality Alliance (GSA) groups and adopt feminist and queer stances in the classroom, at faculty meetings, and in all educational spaces, believing that no one else will volunteer or agree to do this work. School and district administrators come to rely on them to be a beacon of queer representation for LGBTQ+ youth at the school (Meyer & Leonardi, 2020). At the same time, administrators fail to provide resources and compensation when requested; gender minority stress and the lack of support leave gender-diverse teachers feeling overworked, drained, and possibly suffering from burnout (Rice, 2024).

Despite this adversity, gender-diverse teachers may feel driven to be the guiding light of support that they lacked during their own school years (McFarland & Kuehn, 2023). "The ability to give others hope makes any amount of additional stress or career limitations worth it" (Rice, 2024, p. 88). According to Rice (2024), gender-diverse teachers receive much-needed support from their students, who thank them directly and acknowledge and use their honorifics and pronouns in the classroom. Although this does not completely compensate for the lack of administrative and collegial support, gender-diverse teachers come to rely on the community they have cultivated in their educational spaces.

In this paper, we refer to the conceptual framework known as the *Culture of CARE.* We describe how our professional experiences in the K-20 classroom have led us to realize the urgent need for this framework, and we outline the process of creating actionable steps all educators can use. The *Culture of CARE* is a transformative process that positively impacts all students; in this paper, we will focus on gender-diverse students and educators. We have outlined and analyzed the *Culture of CARE* in our previously published work (McFarland & Kuehn, 2023), and this article adds an ethnographic element of reflection and analysis from the authors' professional perspectives. Both authors have extensive experience working in secondary and tertiary school environments, including traditional brick-and-mortar settings, alternative online instruction, and teacher education programs. Our six decades of pedagogical experience and training have culminated in inspiring us to incorporate a leadership lens when considering educational policy and practical solutions in the classroom.

Culture of CARE

A *Culture of CARE* is needed because positive school experiences are neither reliable nor consistent for gender-diverse students. In this framework, CARE is an acronym that stands for *compassion, awareness, respect*, and *empathy*. Although many gender-diverse students can identify one supportive adult at school (Kosciw et al., 2022), this may not be enough to help students navigate the challenges of being queer youth at school. Faculty members, despite being well-meaning, may not know how to support queer students and may lack the administrative support necessary to address their needs (Rands, 2009).

When educators consider implementing the steps of a *Culture of CARE*, adult support for gender-diverse students at school increases, perhaps even in regions where legislative policies may not be beneficial for gender-diverse youth. Not only would it be beneficial for these students to have a community of supportive adults in the school environment, but it would also alleviate the burden on gender-diverse educators. Supporting gender-diverse students means more than simply providing a safe space for students to exist in the classroom (Smith & Payne, 2015). "True transformational change to school climate should extend far beyond professional development opportunities, comprehensive anti-bullying policies, and effective leadership" (McFarland & Kuehn, 2023, p. 576). The *Culture of CARE* outlines an actionable process for creating a nurturing and supportive school climate, not only for gender-diverse individuals but for all people in educational spaces.

Figure 1. Culture of CARE

Culture versus Climate

Before discussing the elements of CARE, it is imperative to distinguish the differences between culture and climate with regard to the positive establishment of the framework of a *Culture of CARE* in educational environments. A wide body of research addresses school culture and climate in relation to student outcomes (Jerald, 2006; Peterson & Deal, 2009; Thapa et al., 2013). There has also been significant debate on defining school culture and climate (Erickson, 1987; Freiberg, 1998; Schoen & Teddlie, 2008), which falls outside the scope of this article. Our purpose is not to offer a literature review of the research on educational culture and climate, but to provide a clear and distinct difference between the two concerning the *Culture of CARE* framework.

In some cases, culture and climate have been used synonymously to represent one another (Glover & Coleman, 2005). However, when implementing CARE, school culture is defined as the mental and developmental growth educators achieve through self-reflection, internal work, learning, and training that sparks action, resulting in improved individual and group outcomes for marginalized individuals in educational spaces. In short, school culture is established through the actions we take within the institution whether they be overarching action with enumerated and inclusive school policies such as mission and vision statements that govern school districts as a whole or smaller tangible actions educators take in their own classrooms to improve student outcomes such as employing culturally relevant teaching practices or including inclusive literature representative of the diverse student population. School climate then refers to the tone, feel, or vibe of the educational environment as a result of implemented action. All educators can take a stake in developing a *Culture of CARE* because the environment is directly impacted by everyone's actions and interactions with others in the educational space. Therefore, the school climate can either reap the benefits of or suffer from the impact of our actions as educators, which include how we decide to act within educational spaces and how we choose to interact with students.

Compassion

Compassion is a feeling that arises when we see someone else suffer, and we feel motivated to help them (Goetz, Keltner, & Simon-Thomas, 2010). Most educators are likely to be compassionate people who care about their students; however, we know that over 83% of students surveyed reported that they frequently heard negative comments about transgender people at school, and only 8.8% said that school staff intervened when they heard those remarks (Kosciw et al., 2022). According to the 2021 National School Climate Survey, gender-diverse students report marginally better experiences when they are attending online or hybrid (i.e., a combination of online and in-person) school settings. The frequency of hearing negative remarks about gender expression from other students has fluctuated over the last ten years, but is generally trending down. Homophobic and transphobic remarks from adults in the school environment, on the other hand, have noticeably increased (Kosciw et al., 2022). This may not be surprising, given that trans and gender-diverse educators experience discrimination themselves and hear transphobic language in the educational environment, sometimes from students but more often from other adults (Buterman, 2015).

A complete reconciliation of this data is impossible. There are likely adults in educational spaces who hold deeply transphobic beliefs. At the same time, there are also likely to be adults who are open-minded and want to learn how to demonstrate compassion in meaningful ways. Some educators may feel afraid of the negative social or professional repercussions of interjecting their personal feelings about gender-diverse students. Smith and Payne (2015) described educators as anxious about having gender-diverse students in the classroom. These teachers may feel insecure about providing the right kind of support and about their knowledge of the topic. However, by avoiding gender diversity as a topic of conversation in educational spaces, teachers are not only missing an opportunity to learn but also failing to translate the compassion they have for queer youth into action. Implementing a *Culture of CARE* can help educators do just that.

Gender-diverse students are not solely defined by their gender but rather exist with complex intersectional identities that impact them physically, emotionally, and psychologically. Compassion motivates us to (re)evaluate a situation. We have both experienced moments working in a comprehensive public school district when we noticed that our queer and gender-diverse students were struggling in their personal lives and the only solace they found was through small acts of kindness we extended to them. For example, we would often bring food to share with students who lacked adequate meals at home and offer safe spaces in our classrooms for them and their friends to eat and congregate without judgment. The practice of providing basic necessities and class materials (i.e., paper, pens, etc.) also supports socioeconomically disadvantaged, homeless, and foster youth who may struggle with the essentials for academic learning.

Integrating compassion into our daily teaching practice must be intentional. One simple change for us involved the way that we structure classroom games. Instead of building teams based on binary conceptualizations of gender, we now build teams based on colors, animals, foods, music, and other themes. These small changes in student interactions and praxis help everyone feel more comfortable without overtly drawing attention to inclusivity. This is actionable, compassionate, and positive, and it establishes an equitable class culture that students come to appreciate and model themselves when they go out into the world. Small changes like these build an inclusive class culture, creating a positive impact on queer youth regardless of administrative policy or support. These little things are often the most meaningful for students, who have consistently expressed to us that they feel "seen" in our classes for the first time, simply because we created a culture of kindness and compassion in our classrooms. Instead of making them feel "othered" and excluded, we took steps to ensure a classroom culture and community that is inclusive for everyone.

When teaching online, demonstrating compassion can be accomplished by including discussion boards at the beginning of all classes, with the main purpose of having students introduce themselves. They have the option to add pronouns, and we encourage students to include a phonetic spelling of their asserted names so peers can learn and use the proper pronunciation. Some students may feel discomfort with their birth names, so we show them how to change identifiers in the learning management system. This small act of compassion affords students an important sense of agency. To build a deeper sense of community in the class, students respond to at least two peers on discussion boards and practice reflective communication skills. At the end of the term, students choose their favorite discussion board, and many choose this introductory activity, explaining that they enjoyed getting to know each other, not only the names they use, but also how they are pronounced, why they have chosen to use them, the history of those names, and the asserted pronouns. Gender-diverse students often express appreciation for this opportunity. Personal profiles and discussion boards allow queer educators to introduce themselves and explain a little more about pronouns, honorifics, and gender diversity. Gender-diverse students may occasionally expand on this discussion in private submission comments, via email, or in person.

It has been our experience that some students may initially be hesitant to engage in the topic of pronouns because they anticipate learning about gender diversity. Some will even say that they "do not have" pronouns or that they use the 'correct' pronouns for their gender. We welcome these conversations because they provide opportunities to reduce potential anxiety and reassure individuals that asserting their pronouns is optional. We also note that it is helpful to reveal pronouns in the online environment, as it reduces the likelihood that someone will misgender them based on their names or profile pictures.

We have observed that adults in the school environment may exhibit more hesitation or concern about honorifics and pronouns than students do. Adults stumble over the use of they/them and neopronouns, and when they make a mistake in our presence, they seem to desire a conversation acknowledging the difficulty of making this adjustment. Some are apologetic, many express a desire for more information or practice, and others express discomfort, confusion, or a sense of being from a different era. Although it is rare for adults in the school environment to openly refuse to honor names and pronouns, 29.2% of students reported being prevented from doing so by teachers and other adults (Kosciw et al., 2022).

This is a very personal and ongoing issue for Heidi. Although the online learning management system allows them to assert their pronouns (they/she), Heidi also has pronouns indicated in their email signature. The only individuals who have ever honored and properly used Heidi's pronouns at school have been students. Since Heidi's last name is difficult for some people to pronounce in English, they have adopted "Dr. K" as a professional name for students to use. Colleagues also use "Dr. K" to refer to them, even though Heidi has explained numerous times that all adults are free to use their first name. Colleagues are fully aware of Heidi's gender identity, and some have expressed professional interest and support. However, Heidi perceives a certain reluctance from colleagues to fully embrace this identity, which is why faculty and staff continue to address Heidi as "Dr. K," keeping them at a professional distance. Other colleagues continue to misgender Heidi by calling them "Miss Heidi," which demonstrates a flagrant disregard for their identity that takes an emotional toll.

Since the beginning of the pandemic, we have observed that students and educators have become more open in discussing the topics of mental health and Social Emotional Learning (SEL). Enrollment at online schools increased as students sought alternate ways to complete their educational journey. Many of these students explained that they felt anxious about returning to traditional classrooms, not necessarily because of their fears of becoming ill but because they did not want to return to spaces where they had never felt comfortable, accepted, or even safe. Students who identify as gender-diverse are among this group. The latest National School Climate

Survey reported that students who attended only in-person school heard negative remarks about LGBTQ+ people more frequently than students who attended online schools or hybrid environments (Kosciw et al., 2022).

The *Culture of CARE* embraces elements of Social and Emotional Learning that frame actionable steps to reducing the stress many queer youths experience in unwelcoming school environments. This unease in educational spaces increases negative impacts on the mental health and suicidality rates of LGBTQ+ individuals in school. In multiple interactions with school district partners, Jon has observed the increasing demand for pre-service teachers to recognize the social-emotional needs of students. Teaching K-12 students post-pandemic has called for a concerted focus on incorporating Social-Emotional Learning (SEL) into the instructional day for all youth. The leading contributor to a comprehensive SEL framework is the Collaborative for Academic, Social, and Emotional Learning (CASEL), which provides clear steps to the development of understanding oneself and relations with others in society (CASEL, 2024). He has reworked the curriculum in his equity and diversity course for pre-service secondary teachers with deliberate course materials and readings that introduce the SEL framework, class activities that afford teacher candidates opportunities to collaborate and share ideas on the implementation of SEL into their content-specific curriculum, and assess student comprehension of SEL through equity lesson plans integrating SEL components throughout. He has also worked with colleagues to continue conversations on the integration of SEL instruction through a *Culture of CARE* specifically for the benefit of LGBTQ+ youth by offering professional development workshops that connect queer representation and recognition with practical SEL application in the classroom.

One recent example was a transgender student who had chosen to switch from an in-person comprehensive high school to the alternative online independent study option. While the student's mental health improved as bullying and discrimination became less of an issue, the student was still receiving therapy, and their grades were inconsistent at best. As their homeroom teacher, Heidi advocated for the student as needed. When the student encountered a particularly challenging Child Development course with triggering topics and a somewhat rigid instructor, Heidi was able to appeal to the teacher's sense of compassion, providing the student with a second chance to pass the course and ultimately ensuring the student's on-time graduation at the end of the year. Compassion begins as a feeling, and the internal work we do as educators to become more compassionate for our queer students can translate into something actionable that makes a positive difference for them.

Awareness

Awareness is the next stage of the *Culture of CARE*. When educators want to do better for their gender-diverse students, they can do so by "educating themselves to become more aware of the historical, social, and political issues that have negatively impacted the queer community" (McFarland & Kuehn, 2023, p. 576). Individuals in the LGBTQ+ community or who are gender-diverse may already have some knowledge or awareness of these issues, but there is always more to be learned. Many educators embrace the idea of being lifelong learners, and there is no shortage of professional development available. However, quality community service and skill-based LGBTQ+ training for pre/in-service teachers that focus on the implementation of queer-affirming practices may not be as readily accessible for many educators (Coulter et al., 2021). Of course, navigating the fluctuating political climate in some regions can be challenging (Bartholomaeus, Riggs, & Andrews, 2017), particularly where diversity, equity, and inclusion (DEI) initiatives and professional development are discouraged.

Educators have a responsibility to ensure that they are aware of state and federal laws, and there is a bevy of anti-trans and non-binary legislation that seeks to erect barriers in some areas (Anti-Defamation League, 2023). Despite this, all individuals in education can access basic information about gender diversity. Just like *compassion*, *awareness* is a practical and actionable concept. All stakeholders in education can seek out basic information and learn to grow as advocates and allies. Educators can begin having open dialogue about issues facing LGBTQ+ youth at their schools, start utilizing inclusive language and pronoun use in professional meetings, and advocate for time and space in the school day for equitable support of all queer individuals in the institution.

In Heidi's Ethnic Studies courses, students learn about California's history. As students explore interactions between various groups of people, they learn about stagecoach drivers. One of these drivers was One-Eyed Charley. Assigned female at birth, Charley lived as a man, and even close friends were surprised to find out at his funeral when his body was prepared. This information invites an interesting discussion about personal and social identity, pronoun usage, and whether or not Charley should be considered the first woman to have voted in California. Introducing interesting historical figures that are often excluded from our history books promotes greater student awareness of the queer lives that existed before younger generations that normalize the queer experience and situate them within the larger context of the human experience.

McEntarfer and Rice (2023) explained that teachers often do not find adequate resources in existing curricula to help them develop lessons that challenge students' assumptions regarding gender. Our classroom experiences reflect the findings of this study. Educators who seek to cultivate feminist and queer stances or challenge binary assumptions about gender are on their own to develop lessons that encourage those goals. Hence, educators must seek out quality supplemental materials to use in their curricula to properly address and represent their student populations, as well as, provide a wider variety of factual information to increase student awareness of the contributions of queer individuals throughout history.

Preparing quality lessons that promote the inclusion of LGBTQ+ historical figures in content-specific areas presents its own challenges. Educators may need to develop their internet skills as they conduct simple internet searches and use the potential of Artificial Intelligence (AI) to help filter through irrelevant content and mitigate the time spent finding useful supplemental material. Educators will also need to invest energy by integrating such material into their already existing curriculum with purpose and intention.

We generally present assignments that focus on inclusivity in such a way that allows students to explore content based on their level of interest, leaving some room for interpretation. We do not require students to agree with one another, and they always have the choice to learn about other historical figures if they do not want to learn about individuals like One-Eyed Charley. We do so because we respect students' rights to develop their own opinions about topics, and we also know that sometimes it takes time to learn new things. If a student has learned about gender from only one perspective for many years from sources they trust, then we will offer an alternative viewpoint respectfully, but we will not insist that everything they have learned thus far is wrong or bad. This depends, to an extent, on the age of the students.

Sometimes, colleagues are interested in hearing about assignments, including those on diverse historical figures, such as One-Eyed Charley, but they may be hesitant about developing their own. Integrating a *Culture of CARE* can help introduce gender diversity and other LGBTQ+ curricula into all subject areas. Seventy-one point six percent of students reported that their classes did not include any LGBTQ+ topics (Kosciw et al., 2022). Educators who incorporate a *Culture of CARE* into their curricula recognize that representation is recognition. When students see themselves culturally and linguistically represented in the classroom through diverse literature, imagery, and real-world examples, they are more likely to excel academically and demonstrate increased engagement in academic settings (Chardin & Novak, 2021; Snapp et al., 2015). Teachers can demonstrate queer representation in small but impactful ways by choosing images that represent the LGBTQ+ community in their presentations, using culturally sensitive and appropriate language in discussions with students concerning queer content, and demonstrating their awareness of cultural and racial privilege by recognizing internal bias and avoiding microaggressions that target the LGBTQ+ community. All educational partners can increase their awareness not only of the present-day existence of gender-diverse individuals but also of the fact that gender diversity has been an ever-present facet of human history. This is necessary to dispel the myth that gender diversity is a new or modern social trend.

Respect

As with compassion and awareness, respect begins with an internal feeling but continues with something that is actionable (McFarland & Kuehn, 2023). A good example of this is using an individual's asserted names and pronouns, not only in their presence but also when they are not around. We demonstrate respect for others when we honor their identity, even when they are not present, as well as honor the identities of people who are young and not fully mature. There is sometimes a tendency for adults to express dismissive behavior by saying that young people do not know who they are in terms of sexuality and gender, and for this reason, they do not consistently respect their names, pronouns, and other queer identities. The suicidality rate of transgender individuals, which is already extremely high at over 40%, can be potentially mitigated by a large margin when at least one person honors the person's asserted names and pronouns (James et al., 2016; The Trevor Project, 2023).

Respect is an actionable concept that can be learned and practiced. Even online, students introduce themselves in the discussion board, and then these names and pronouns are used repeatedly in meetings, submission comments, emails, and all interactions. This is not burdensome for the online teacher, and it is a deeply meaningful way to demonstrate respect for the students' identities.

Gender-diverse educators are more likely to experience the support of colleagues when they have an administration that supports them (McEntarfer & Rice, 2023). Suárez et al. (2022) conducted a study of transgender workers in schools, and about a third of these participants reported that they did not feel emotionally safe at work, with 29% saying that they experienced verbal harassment. Unfortunately, these results are not surprising; our experiences at work have sometimes left us feeling emotionally drained and potentially unsafe. Having supportive administrators and colleagues would help all educational partners feel respected. Much like Rice (2024), we consider it of utmost importance to create not only a safe space for students, but also to give them hope and motivate them to educate others, thereby fostering a culture of equal respect for everyone.

Establishing a sense of respect for all within a safe learning environment requires equitable classroom norms that educators consistently enforce and adhere to. It is important for teachers to discuss early on what behaviors are acceptable and those that will not be tolerated. The discussion on how we treat one another in class and online is best addressed as a whole class, with the input of all participants affirmed. In Jon's Diversity and Equity course for pre-service teachers, he begins the first session by introducing the ground rules for class meeting norms, to which all students contribute. Students often develop guidelines for how they will treat and interact with others based on past negative class experiences. Jon then discusses, models, writes, and shares these guidelines with all class members. The commonly agreed-upon norms are then posted in the physical classroom and online course space for all to see and reinforce. In this way, they can be easily referred to or added to as needed. The deliberate incorporation of student input when setting guidelines for member interactions is a way to center the students as the focus of the class environment that educators wish to build. Teachers implementing a *Culture of CARE* strive to create a cohesive and collegial classroom community within the learning environment, recognizing the importance of student contributions to that end.

Educators who seek to develop a deep sense of respect through a *Culture of CARE* in their classes also empower students with opportunities to create positive social change in their communities. Many teachers feel burdened and obligated to cover curricular standards through outdated pedagogical methods, including direct instruction, lecture-style presentations of content, and traditional written exams that do little to spark student interest and engagement. Various teaching methods, such as problem-solving pedagogy (Ezeddine et al., 2023), inquiry-based learning (Abdi, 2014), or cooperative learning (Felder & Brent, 2007), are combined with innovative assignments that provide students with multiple opportunities to demonstrate content knowledge while enhancing their cultural understanding of LGBTQ+ issues.

Empathy

Empathy is the final stage in the *Culture of CARE* model. To empathize is to emotionally put oneself in the shoes of another by seeking to understand how the other person is feeling. Empathy differs from sympathy in that the latter stems from a deficit-based mindset rooted in pity. Queer and gender-diverse students experience life differently from their cisgender and heterosexual counterparts which can be emotionally and socially draining for them. When working with any disenfranchised population of students, there is no place for deficit-based thinking by believing that they are in any way "less than" anyone else. When we empathize with students, we strive to understand them better in order to help them succeed. We want to relate to their experiences and understand their perspectives (McFarland & Kuehn, 2023). Gender-diverse students are likely to experience marginalization; developing the ability to empathize with their experiences is a helpful step in reducing the oppression they may experience (Goodman, 2000).

In one example, a transgender student of Heidi's was preparing for their exit interview from high school with the principal. Knowing that the administrator had little to no understanding of this student's gender identity, they wrote a proactive email to the principal to remind him that the student uses the pronouns "they/them." This small but impactful action gave the student the best chance of not being misgendered and also helped the principal avoid any missteps during their meeting. Being an empathetic educator means knowing our students well, recognizing and even anticipating when they may experience hardship, and then being there for them, even if the gestures we make may seem small and go unrecognized. When we practice empathy with students, we are not centering ourselves in the situation and therefore do not require acknowledgment or thanks. Sometimes, the student, as above, does not even know that we have empathized with them. Empathy can be a tangible and beneficial action taken for the benefit of another individual, as it stems from our genuine care for their well-being.

We empathize with students even when they are not present. The self-exploratory assignment that Jon conducts with his pre-service teachers is to teach them empathy for the diverse student population they will encounter in California public schools. Jon asks students to consider how changes to their daily routine can enhance their understanding of themselves and others. The purpose of this activity is to reflect on the feelings that arise when engaging in a cultural shift. To complete the assignment, students alter their daily routine for one week in such a way that resembles the routine experiences of marginalized students (i.e., undocumented, unhoused, LGBTQ+, etc.). Their written analysis of the experience includes what they did, how they felt, how the experience may have changed their thinking, and how it offers new insights into learning and teaching diverse learners. The idea is to place themselves in a situation where they are not accustomed to the routines and rituals. The value of this assignment lies in how willing they are to stretch themselves as they learn empathy for other groups of people.

Other examples of practicing empathy with struggling students include providing brain breaks or short pauses during instructional time to help them recenter themselves. Engaging students with interactive journal dialoging where they can share (in writing or video) their feelings and experiences with the teacher is a good opportunity for educators to better understand the challenges their marginalized youth face and for students to express themselves in safe dialogue with a caring adult. The teacher establishes the journal as a safe space for students to converse, receive counsel and mentorship, or just vent without judgment. When teaching high school English, Jon encouraged students to maintain regular journal time throughout the course. Each student had their own designated notebook, which they could decorate for personalization. They could either respond to provided journal prompts or use the time to write about what was on their minds that day. Students had the agency to be creative, vulnerable, or critical without judgment and without worrying about losing points for grammar or punctuation. Students trusted that their teacher would keep their journal entries private and knew that the goal was to build relationships and create connections, and community. Frequently, students would share authentic poetry, share lyrics to songs that resonated with them, express their frustration with their family or living situations, and engage their teacher with questions to which he would respond. Activities like reflective journaling promote a mindful awareness of students' present state (Crawford, Sellman, & Joseph, 2021), create mutual respect between teachers and students that can bridge cultural and generational gaps, and improve communication and class culture.

Recognizing when students are hurting should then trigger further action from the teacher, perhaps by meeting students at the door to gauge their emotional state, sending an encouraging note or email of support, asking to chat with the student after class, or providing additional resources for them to follow up on. To demonstrate empathy is to practice kindness in ways students do not expect from their teachers, showing that educators care for their well-being in and out of the classroom.

While implementing the multiple elements of a *Culture of CARE* may seem second nature for some educators, it may seem daunting for others. Creating a school culture that supports gender diversity is beneficial for all educational stakeholders (McFarland & Kuehn, 2023; Rice, 2023, 2024), and having just one supportive adult can reduce suicidality (Kosciw et al., 2022). With a *Culture of CARE*, we can do better than that; queer and gender-diverse individuals have a right to thrive in society.

Conclusion

In short, every educator can develop and implement a *Culture of CARE* founded on compassion, awareness, respect, and empathy that best supports the needs of our gender-diverse youth, despite the political influences, social pressures, and professional landscape of the broader educational institution. The willingness to do so starts with us. Educators must want to do better for our queer youth, show them that we have their best interests at heart, and do the work necessary to create spaces for gender-diverse individuals, not only to survive, but to thrive. By implementing a *Culture of CARE* in our classrooms, we lead by example, showing others how to embrace an inclusive educational climate for the benefit of all.

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College Students' Understanding of Wellness

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Abstract: This study explored the extent to which Wellness Dimensions were an effective self-assessment tool for holistic well-being among undergraduate college students. The goal was to explore college students' understanding of wellness and how they apply wellness in their lives. Wellness behaviors span across eight dimensions: social, spiritual, physical, intellectual, emotional, financial, occupational, and environmental. We surveyed 149 students enrolled in psychology courses over two semesters at a Southeastern university in the United States. Results revealed significant trends in compliance with external advice among other things. Notably, 83% of students adhered to advice received from campus personnel, 73% reported stress and exhaustion, and 64% experienced unrestful sleep. The findings suggest a tendency toward external locus of control in social and financial dimensions, with students prioritizing academics over financial planning (63%) and exhibiting compliance with peer influence (64%). Emotional well-being concerns emerged, with 54% hesitant to address conflicts. Despite 64% engaging in spiritual practices, high stress levels persisted. Additionally, students were environmentally conscious (61%) but struggled with personal time management. These findings underscored the need for, and importance of integrating wellness education into college programs to foster balanced, holistic development.

Keywords: Wellness, Wellness Behaviors, Wellness Dimensions, Wellness Education, Well-Being

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Introduction

Wellness is a multifaceted construct encompassing various dimensions that collectively contribute to an individual's overall health and well-being. The acknowledgment of these dimensions underscores the importance of adopting a holistic approach to wellness, one that transcends mere physical health and encompasses aspects such as social connections, emotional resilience, financial stability, and existential meaning among other things. In this paper, we delve into the eight dimensions of wellness, namely social, emotional, financial, environmental, physical, intellectual, occupational, and spiritual, exploring their significance, interconnections, and implications for personal and collective flourishing.

Social wellness pertains to the quality of one's social interactions and relationships. It encompasses aspects such as a sense of belonging within communities, communication skills, and empathy (Keyes, 1998). Strong social connections have been linked to enhanced overall well-being, reduced stress levels, and improved mental health (Thoits, 2011). Conversely, social isolation and loneliness can have detrimental effects on both physical and mental health, highlighting the importance of fostering a sense of social connectedness and nurturing meaningful relationships (Bruss, et a., 2024; World Health Organization, n.d.).

Spiritual wellness involves finding meaning, purpose, and connection with something greater than oneself. It encompasses values, beliefs, and practices that provide a sense of inner peace and harmony (Jaberi et al., 2019). According to Koenig et al. (2012), spiritual wellness can be expressed through organized religion, acts of altruism and compassion, meditation, or nature appreciation. Cultivating spiritual wellness is believed to foster hope, love, and forgiveness among other things (Villani et al., 2019).

Physical wellness encompasses aspects related to bodily health and vitality. It involves engaging in regular physical activity, maintaining a balanced diet, getting adequate sleep, and avoiding harmful substances (Hung et al., 2023). As Warburton et al., (2006) explained, physical wellness not only enhances physical health but also improves mood, cognitive function, and overall quality of life. Adopting healthy lifestyle habits and prioritizing preventive healthcare measures are fundamental for promoting physical well-being and longevity (Centers for Disease Control and Prevention, n.d.; World Health Organization, 2010).

Intellectual wellness involves the pursuit of knowledge, critical thinking, and lifelong learning. It encompasses engaging in intellectually stimulating activities, pursuing educational opportunities, and expanding one's cognitive horizons (Guamanga et al., 2024; Narushima et al., 2018). Intellectual wellness fosters creativity, problem-solving skills, and a sense of curiosity and wonder (Javidi et al., 2022). According to Smith (2023), nurturing intellectual wellness is essential for enhanced creativity, lifelong learning, open-mindedness, and cognitive resilience.

Emotional wellness involves the ability to understand, express, and manage one's emotions effectively (Park et al., 2022). It encompasses self-awareness, self-acceptance, resilience, and the capacity to cope with stressors and challenges (Frijda, 2006). Cultivating emotional intelligence and engaging in practices such as mindfulness and self-care are essential for promoting emotional well-being and psychological resilience (Jiménez-Picón et al., 2021)

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Financial wellness refers to the ability to manage one's finances effectively and sustainably. It encompasses behaviors such as budgeting, saving, investing, and debt management (Mathew, 2022). Financial stability not only reduces stress and anxiety but also provides individuals with the resources to pursue their goals and aspirations (Lambert et al., 2023). However, financial stressors can significantly impact mental and physical health, highlighting the importance of financial literacy and planning for long-term financial security (Riu & Fan, 2023).

Occupational wellness pertains to finding meaning, satisfaction, and fulfillment in one's work or chosen vocation. It involves aligning one's career with personal values, interests, and talents, as well as maintaining a healthy work-life balance (Gragnano, 2020). Occupational wellness promotes professional growth, financial stability, and a sense of purpose and accomplishment (Warr, 2007). According to Vallasamy et al. (2023), work-related stressors and dissatisfaction can have adverse effects on both physical and mental health, highlighting the importance of cultivating a supportive work environment and pursuing meaningful career paths.

Environmental wellness pertains to the relationship between individuals and their surrounding environment. It encompasses behaviors that promote environmental sustainability, such as conservation, recycling, and minimizing ecological footprint (Meaden, 2024; Yildirim). A healthy environment is conducive to physical health, mental well-being, and overall quality of life (Frumkin, 2001). Conversely, environmental degradation and pollution can pose significant threats to human health and ecosystem integrity (National Institute of Environmental Health Sciences, n.d.), emphasizing the need for proactive environmental stewardship and conservation efforts.

As Matthies et al. (2022) highlighted, understanding wellness empowers individuals to make choices that promote health and well-being. In addition, if students are aware of these eight dimensions and their significance, they can navigate their academic journeys with greater confidence and less stress. We posit that by integrating wellness education into the fabric of higher education, institutions can cultivate a culture of holistic well-being which ultimately enhances students' academic success and overall quality of life.

Methodology

Purpose

Although the Wellness Dimensions is an unstandardized assessment, it is a tool easily used for self-exploration for humanistic and holistic health. Each dimension is not a separated aspect but blends and integrates holistically. As presented in the literature, life satisfaction is more readily the outcome of a balanced life, and neglecting any one wellness dimension could negatively impair an individual’s wellbeing, especially, since chronic neglection or avoidance could lead to mental health issues. Regarding college students, a chronic neglection could lead not only to mental health concerns but retention issues as well. Therefore, although each person may differ based on their needs and values in any context, the overall goal of a wellness dimensions tool is to aid the individual in his/her self-evaluation and reflection, and thus, to aspire and maintain balanced holistic wellness by achieving authentic wellbeing and harmonious existence within one’s environment.

Procedure and participants

Due to the increased trends of mental health concerns and college student retention (American College Health Association, 2023; Center for Collegiate Mental Health, 2022; Xiao et al., 2017), a pilot study and survey were submitted and approved by the Tennessee Tech IRB for two survey disseminations among undergraduate college students (n = 149). The pilot survey contained 16 questions pertaining to areas of the Wellness Dimension (emotional, social, environmental, financial, intellectual, physical, spiritual, and occupational) which inquired if the participant incorporated a sense of wellness behaviors in their lives. As volunteers, the participants were asked to read each question and identify "Yes" or "No" as his/her response. The participants were undergraduate college students enrolled in psychology courses at a Southeastern university.

Results

After two disseminations, 149 undergraduate college students completed a pilot study survey (see Table 1). Overall, the results suggest that undergraduate college students would comply with another person's personal advice (83%) and comply with another's direction (64%) even if their own preferences would be different. When reviewing responses for the Wellness Dimensions which reflected a more internal locus of control (Spiritual, Physical, Intellectual and Emotional), these participants identified themselves as engaged in religious practices daily or weekly (64%), stressed out and exhausted (73%), had unrestful sleep (64%), would forego appearance and daily personal tasks due to time constraints (65%), believed campus instructions were stressful and boring (65%), and were split in responses of preferring to work and learn individually (52%) or as a group (48%) on course assignments. In addition, in regards to the Emotional Dimension, nearly half of the respondents (52%) indicated they were comfortable stating their feelings to a date without fear of rejection, but yet, were uncomfortable (54%) approaching a conflict with another person. Lastly, when reviewing responses for the Wellness Dimensions which reflect a more external locus of control (Financial, Occupational, Environmental), these participants identified themselves as focused on school as opposed to their financial situation (63%), and therefore, were not financially prudent (52%). In addition, 59% of the participants identified that they would not reach for food, alcohol, or supplements to aid themselves with balancing the demands or work and school, and 65% would not consider school as an avenue to find and commit to a life partner/marriage partner. In regards to the Environment Wellness, 61% were conscious of waste and recycling, and almost half of respondents (54%) would clean up after themselves. Therefore, overall, the majority of responses reflected about one-half of total responses. This trend was suggestive that each Wellness Dimension could be fodder for future research. Specific responses of the pilot survey were provided in the table below.

Table 1. Wellness Dimension Responses (Pilot Study)

Social Dimension

1. I believe that it is important to comply with personal advice given to me by campus personnel such as the dorm residential assistants, course graduate assistants, and faculty.
   Yes = 123 (83%)
   No = 26 (17%)
2. Sometimes, I find myself going along with an activity with another person or others even though I really don't want to do so.
   Yes = 96 (64%)

No = 53 (36%)

Spiritual Dimension

1. I engage in spiritual or religious practices on a daily to weekly basis.

   Yes = 96 (64%)

   No = 53 (36%)

2. I am stressed out, exhausted, and hope to make it to the end of the semester with passing grades.

   Yes = 109 (73%)

   No = 40 (27%)

Physical Dimension

1. I get enough sleep and awake feeling well-rested.

   Yes = 53 (36%)

   No = 96 (64%)

2. I have become so busy during the semester that I find myself not spending the time that I usually spend on my appearance such as fixing my hair or laundering my clothes.

   Yes = 95 (65%)

   No = 54 (35%)

Intellectual Dimension

1. The continuous instruction at campus has left me feeling mentally exhausted, bored, and zoned out.

   Yes = 95 (65%)

   No = 54 (35%)

2. I enjoy learning and doing group projects with my peers as opposed to doing the work and learning by myself.

   Yes = 71 (48%)

   No = 78 (52 %)

Emotional Dimension

1. I am completely comfortable stating my feelings and thoughts to my date without intimidation or fear of rejection.

   Yes = 77 (52%)

   No = 72 (48%)

2. When I sense an unspoken conflict between myself and another person(s), I am confident in bringing up the issue to discuss out in the open.

   Yes = 69 (46%)

   No = 80 (54%)

Financial Dimension

1. My focus is to concentrate on my classes, so I am not allowing as much energy to focus on a

financial budget at this time.

Yes = 93 (63%)

No = 56 (37%)

2. I consider myself financially prudent and I live within a budget which I had designed for myself.

Yes = 72 (48%)

No = 77 (52%)

Occupational Dimension

1. I usually can balance the demands of work and school, but in moments of crisis, I usually reach for food, alcohol, or supplements to keep me going.

Yes = 61 (41%)

No = 88 (59%)

2. One of my goals in attending college was to find a life partner or marriage partner.

Yes = 52 (35%)

No = 97 (65%)

Environment Dimension

1. I am aware of waste and do my part to recycle such as turn off electronics when not in use, and not take more food that I will consume.

Yes = 91 (61%)

No = 58 (39%)

2. I can become so busy that I have had to leave food wrappers, cans, bottles or dishes without cleaning after myself.

Yes = 69 (46%)

No = 80 (54%)

Discussion and Implications

Surprisingly, on several Wellness Dimensions, nearly half of the respondents indicated a potential impairment or neglect. The Social Dimension appeared to have the highest impairment indication. For example, when asked if the participant believed in compliance with personal advice received from dorm residential assistants, graduate assistants, and faculty, 83% of the respondents agreed while 17% declined. One ponders if the supportive participants were familiar or comfortable with a lifestyle in which personal advice was easily offered, perhaps through social media and AI, and concurred with the construct that following such personal advice from others who may not have the authority or training to offer the advice was actually an accountable source. However, dorm residential assistants, course graduate assistants, and faculty do not serve the purpose of providing personal advice to college students and are not substitutes for campus counselors and other personnel who are trained and/or licensed in personal matters. Secondly, when asked if the participant goes along with an activity with another person or others even though he/she really doesn't want to do so, 64% agreed while 36% declined.

Perhaps this agreement to go along with another's lead while foregoing one's own preference was another indication of compliance to others as reflected in the first question. Unfortunately, these college students seemed to reflect a lack of understanding of healthy relationships and boundaries. This would seem to be a possible lifestyle of college students' reliance on AI for directions on living and problem-solving.

Congruent to the Social Dimension, responses to the Emotional Dimension suggested problematic issues are well. When asked if the participant was comfortable stating his/her feelings and thoughts to a date without intimidation or fear of rejection, the participants responded with a close split of 52% in agreement and 48% who were not. One may ponder if social media and hookup behaviors (sexual encounter without commitment or a "one-night stand") facilitated the inhibition to declare one's honest preference and interpretation without retribution. Perhaps, bullying and cyberbullying have unfortunately been active in their lives resulting in guarded awareness of unwanted internet postings. This can also be inferred when participant was asked if he/she felt confident in broaching a conflict for open discussion resulting in 46% in agreement and 54% opposed.

In regards to the Spirituality Dimension, 64% of participants indicated that they engaged in spiritual or religious practices on a daily to weekly basis. However, the participants may not rely or have had the awareness to rely on their own strength and resiliency inherent in spirituality as indicated by 73% participants who identified themselves as stressed out and exhausted while hoping to pass courses. This conflict could represent a lifestyle belief that spiritual or religious practices were only applicable and practiced in the church/temple and were not applicable outside of that context. Another possibility is that the participant did not use spirituality or religious practices as a time devoted to Divine communication and pervasive reflection but had engaged in religious practices on a more mechanical manner, i.e., "pew warmer." This result is unfortunate since research has documented the link of spirituality and religious practices to life satisfaction (Ten Kate et al., 2017; Sholihin et al., 2022; Terneus, 2021).

Congruent with the Spirituality Dimension, the Physical and Intellectual Dimensions also reflected exhaustion as a preferred response. For example, 64% of participants identified that they did not get enough sleep and did not awake rested, and 65% indicated that they were so busy that they did not have the time they had normally allotted to tasks such as laundry and personal appearance. Additionally, 65% of participants indicated that campus instruction was mentally exhausting and boring, while there was a close split in the style of instruction with a preference for individual learning (52%) or group projects (48%). A major concern for research may be to examine sleep behavior patterns or sleep disorders among college students. In addition, are students making good decisions in course selection, the type of course instruction, the number of courses taken per semester, other attention/time consuming responsibilities (home, family, career, etc.). Further research would provide pertinent insight for college student development.

The Financial and Occupational Dimensions were also indicative of problematic issues. In regards to the Financial Dimension, 63% of participants were not focused on a financial budget at this time, followed by a close split of 48% of participants who identified themselves as financially prudent and living within a budget versus 52% of participants who did not. With respect to the Occupational Dimension, 41% of participants indicated that they could balance the demands of work and school, but would reach for food, alcohol, or supplements as needed but 59% of participants would not. Additionally, 35% of participants had identified one goal of attending college was an avenue to find a life partner or marriage while 65% did not. Therefore, one ponders how and if college students understand financial responsibility, the need and outcome of a college degree, the expectancy value used their decision-making process as well as the expectation by some of find a life partner/marriage and if this expectation was fueled by hookup behaviors or AI interpretation. Regarding the Environment Dimension, 61% of participants indicated that they were aware of waste and were active in recycling, and half of the participants (54%) would not leave food wrappers or debris without cleaning after themselves no matter how busy they were. Collectively, these participants seemed to be more positively active in their environment pertaining to things as opposed to their environment pertaining to people.

Conclusion

Although this was a pilot study, the results provided an inference of college students' life orientation and indicated further research of college student's holistic development. Almost all Wellness Dimensions offered a need for more specific research, especially to validate the participants' understanding of the question posed. For example, the participants of this study reside in the "bible belt" area of the United States, yet answers failed to reflect the reliance upon their faith during difficult times as documented by research (Goodman, 2020). One ponders if the "separation of church and state" via the First Amendment may instill the construct that government and religious practices should not be confused and intertwined. Another factor may be that the question did not directly ask the participant to consider how religious practices aid him/her in daily life and struggles, and therefore, future research would support if and how faith does aid young adults.

Concerning the Social Dimension, participants who will forego their own preference for another's choice has been noted by Carl Rogers, a humanistic psychotherapist, who warned that individuals who did not live an authentic lifestyle would succumb to high levels of anxiety (Comer & Comer, 2017). One ponders the generalization of this lifestyle choice, for example, in hookup behaviors, substance ingestions, and at-risk behaviors. On another note, one ponders the acquisition of Artificial Intelligence (AI) as an internet character companion with humanlike features as well as ChatGPT, superhuman, or other AI-augmented healthcare systems already used as the standard for interpersonal relationships and authority figures (Bajwa et al., 2021). This area would definitely provide interesting data in how interpersonal relationships will transform. Thus, it could be that arising generations will provide tendencies of transformations and possibly redefining wellness and stages of human development.

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The integration of the Inscribe Virtual Community in the Online Mathematics Classroom

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Abstract: Virtual Learning Communities provide on-demand engagement and collaboration among students, their peers, tutors and instructors. In addition, students can participate in these communities at their convenience anywhere and time. This study investigates students' perceptions of the use of the InScribe Virtual Learning Community in an online college mathematics course. The participants in this study were 39 undergraduate students enrolled in a College Algebra course. Data were collected using a 5-point Likert-type questionnaire that included two open-ended questions. The results indicated that most students in this study had a positive attitude towards the use of InScribe in the mathematics classroom. Moreover, the study indicated that the students believed that InScribe had a positive impact on their learning, their classroom participation and interaction with tutors and instructors.

Keywords: Mathematics education, Virtual learning community, InScribe, Student perception.

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Introduction

A Virtual Learning Community (VLC) can be defined in a variety of ways, including the following: an online resource “for sharing tools and ideas” (University of Chicago, 2024), a “clearinghouse for the peer support workforce” (APS Virtual Learning Community, 2024), or a “collaborative development of content, resources, and technology tools” (NC Community College System, 2024). The present research study is conducted at Arizona State University (ASU). ASU educators have access to tools that incorporate VLCs into CANVAS, a learning management platform (LMS). This paired technology allows students to engage and collaborate with peers, tutors and instructors at any time. With the increase in use of these technological resources, many questions arise:

Are VLCs useful?

Are students authentically engaged with VLCs? Are VLCs contributing to student learning?

Research shows that some educators find that VLCs are more effective in student learning when used as a follow-up to face-to-face instruction (Wannapiroon & Pimdee, 2022). Other educators depend solely on VLCs due to circumstances, such as a global pandemic which prevent face-to-face learning (Ferguson et al., 2021). Educators who use VLCs as supplemental and as primary resources claim that learning objectives are being met under both scenarios. Virtual classroom resources can include a variety of branded online communication platforms such as InScribe, Slack, Discord, and Microsoft Teams. InScribe is the main platform that educators use at Arizona State University. The platform serves over five million students each year (InScribe, 2024). While some research has explored the use of VLCs in teaching and learning across different disciplines, further research is needed on its impact in mathematics courses.

Framework

This study is grounded in the learning principles of constructivism. Constructivism consists of two parts: cognitive constructivism, and social constructivism. Cognitive constructivism posits that learners use their personal experiences and backgrounds to interpret and construct knowledge. Social constructivism emphasizes the importance of the social aspect of learning, as human experience and learning are situated within the social interaction.

The three key figures behind the constructivist theory of learning are psychologists John Dewey, Jean Piaget, and Lev Vygotsky. Piaget's influence was on cognitive constructivism, while Vygotsky focused on the social aspect of learning. Dewey focused on both the cognitive and social aspects of constructing knowledge. Both Dewey and Vygotsky emphasized the "the role of cultural forms and meanings" in the process of developing "higher forms of human thought" (Brau, 2024). Dewey and Piaget focused on "the importance of nurturing independent reasoning" (Brau, 2024). According to Vygotsky, new learning occurs within the zone of proximal development when students use their own knowledge and build on it with help of an instructor or a group to gain new knowledge.

The educational theory of social and cognitive constructivism is at the heart of VLCs which are extensions of physical learning communities (Ke, 2004). These student-centered spaces promote learning within social contexts as learners collaborate to create meanings and solve problems. Cognitive constructivism emphasizes the importance of the learner's personal experiences and acquired knowledge as basis for new ideas to develop. Social constructivism focuses on the effects of the learner's social environment and collaborations with others to construct knowledge (Brau, 2024). As culture quickly shifts in this twenty-first century information age, VLCs have the potential to parallel shifts from one class of students to the very next class. This phenomenon of shifting norms frames the notion of social constructivism (Hollins-Alexander, 2013. According to the constructivist theory, people create reality through their social interactions and experiences. Meaningful learning is a product of this social interaction. VLCs purpose is to create the setting for social interaction and learning to take place.

The Virtual Community of InScribe

What is InScribe?

InScribe is a virtual learning community that "leverages the power of community and artificial intelligence to connect students with the answers, resources, and people they need to succeed" (InScribe, 2024). It is a digital tool "that empowers students to engage with each other beyond discussion boards, peer review, or group assignments" (Miller, 2022). It "was born out of a belief that every learner should have access to a level playing field of the information most critical and relevant to their success" (InScribe, 2024). InScribe was built on the following convictions:

- Everyone has questions - many are afraid to ask.
- Learners have as much to contribute to learning as the experts who support them.
- The best education is collaborative.

InScribe provides students with a space to which they can turn whenever they need help, wherever they are. Students benefit from the peer-to-peer, and student-to-expert collaborations "that helps them feel more connected, increasing student engagement, satisfaction, and retention" (InScribe, 2024).

InScribe and Competitors

InScribe is a virtual learning community platform that provides learners with an alternative to waiting in for a teacher's reply regarding questions that can likely be answered by classmates (YouTube, 2019). The platform's efficacy lies in its capacity to provide students with timely responses to their needs. Most student participants are likely to find that most of the questions they have were already asked and answered. When the question has not been already asked and answered, posting it will garner a swift and relevant reply. Learners are trained to participate in the InScribe community with the intent of not only gaining knowledge but also of sharing knowledge. The platform claims to serve as an ecosystem which thrives on just-in-time support and a sense of belonging among participants. InScribe is especially utilized by educators to enhance student engagement (Ettleman, 2022). Students in higher education who participated in the InScribe community reported that they felt comfortable and connected to their peers when using the platform (Mowreader, 2024). They also reported feeling satisfied with the ability to control conversations and operate in real time.

Microsoft Teams promotes its VLC as a cost-effective resource for communicating in real time (Microsoft, 2024). It also offers timely support by connecting a community of learners together. The free version of the service provides extensive information sharing tools. It offers instant messaging between contacts as well as chatting between user groups.

Slack is another just-in-time service that brings together "people, conversations, data, and a collection of your favorite apps" in one place (Slack, 2024). This virtual learning community claims to offer expedited collaboration and flexibility of choice. It allows users flexibility using formalities demanded by email etiquette, for example. Slack claims to differ from Microsoft Teams in that it provides a more user-friendly interface. According to the platform, "[Slack users] are 17% more likely than Teams or email users to report higher levels of self-perceived expertise." A comprehensive comparison of Microsoft Teams against Slack found that both collaboration tools prove powerful, and the best choice depends on the needs of the organization (Team, 2023).

Why Integrating InScribe into the Online Mathematics Classrooms?

What if students can get their math questions answered just in time, with limited delay, at the very moment when they are available to study and are motivated to learn? Since professors cannot be available on demand to serve all students, there is benefit in providing another solution to the needed question/answer model using on-demand tools. InScribe has been named as one tool that can potentially help with that in the mathematics classroom (Ettleman, 2022). If the product offers what it promises, which is readily available responses to pressing questions and real time access to like-minded learners, then there seems to be potential for improved achievement of learning outcomes and objectives.

Research Questions

The purpose of this study was to investigate students' perceptions of the effects of the integration of the InScribe Virtual Community in the online mathematics classroom. This research study aimed at answering the following five questions:

1. What are the attitudes of students toward the integration of the InScribe Community in the online classroom?
2. What are students' perceptions of the effects of using the InScribe Community on their learning?
3. What are students' perceptions of the effects of using the InScribe Community on their participation and interaction with their classmates, tutors, and instructors?
4. What are students' perceptions of the effects of using the InScribe Community on their feeling of belonging?
5. What are students' perceptions of the benefits of using the InScribe Community in the class?

Method

The participants in this study were 39 undergraduate students at Arizona State University. The students were all enrolled in an online mathematics course that incorporated the use of the virtual learning community InScribe. The course was taught by one of the researchers. Students were enrolled in the course by regular registration procedures and were asked to volunteer to participate in the study as anonymous participants. Data were collected using a 5-point Likert-type questionnaire with two open-ended questions. The scale ranged between Strongly

Agree to Strongly Disagree. The researchers administered the questionnaire during the Spring 2024 semester. The questionnaire items were developed by researchers based on the aim of the study and the review of the literature.

Results

The student responses of the 5-point Likert-type questionnaire items were collected and grouped into four categories: students' attitudes toward the use of InScribe, students' perceptions of the impact of using InScribe on their learning, students' perceptions of their classroom participation and interaction while using InScribe, and students' perceptions of belonging while using InScribe. In addition, students' responses to the questions investigating the benefits of using InScribe in the class and their opinions about whether the use of the InScribe Community make them feel part of a community were tabulated. In the following discussion, the designation of "Agree" includes all "agree" and "strongly agree" responses while the "Disagree" designation includes all "disagree" or "strongly disagree" questionnaire responses.

For the first category: students' attitudes toward the use of InScribe, 92.31% of the participants agreed that they were comfortable participating in the InScribe community; 38.46% enjoyed using it in the class while 15.38% disagreed. In addition, 38.46% indicated that they would like to use it in other classes, while 15.38% disagreed. Most students expressed a favorable level of support for the use of InScribe in the classroom ranging from 30.77% to 92.31% while the percentages of students who disagreed ranged from 0% to 23.08% which indicates that participants had a non-negative view about the use of InScribe in the classroom (see Table 1).

Table 1: Student ' Attitudes Toward the Use of InScribe

Item	Agree	Neutral	Disagree
I felt comfortable participating in the InScribe Community.	36	3	0
I enjoyed using the InScribe Community in the class.	15	18	6
I would like to use the InScribe Community in future classes.	15	18	6
I have found the InScribe Community easy to use.	24	12	3
I think that participating in the InScribe community is going to add value to my college experience.	21	9	9
I enjoyed participating in the InScribe Community.	12	24	3

For the second category: students' perceptions of the impact of using InScribe on their learning, 46.15% indicated that using InScribe helped them develop confidence in the course concepts, while 23.08% disagreed. Similarly, 46.15% indicated that using InScribe improved their learning, while 23.08% disagreed. Moreover, 53.85% agreed that using InScribe made it easier for them to understand mathematical concepts while 8% disagreed. Students' responses indicated that students believed that the use of InScribe had a positive impact on their learning (see Table 2).

Table 2. Students' Perceptions of the Impact of InScribe on Their Learning

Item	Agree	Neutral	Disagree
Participating in the InScribe Community helped me develop confidence in the course concepts.	18	12	9
Participating in the InScribe Community made it easier for me to understand the course mathematical concepts.	21	15	3
I felt that participating in the InScribe Community improved my learning.	18	12	9
I felt that the use of the InScribe Community in the class made learning more interactive.	18	15	6
Interacting with my classmates through the InScribe Community helped me complete assignments on time.	6	21	12

For the third category: students' perceptions of their classroom participation and interaction while using InScribe, 23.08% agreed that the use of InScribe motivated them to participate in their classmates' discussions, while 53.85% disagreed. Regarding classroom interaction with the instructor and tutors while using InScribe, 38.46% of students agreed that the use of InScribe increased their interaction with their instructor and tutors, while 15.38 % disagreed. Also, 53.85% indicated that the use of InScribe motivated them to seek help from tutors, instructors, and classmates while 15.38% disagreed. Students' responses indicated that students believed that the use of InScribe had a mostly positive impact on their classroom engagement and increased their interaction with their instructor and tutors but did not motivate them to actively participate in classmates' discussions (see Table 3).

Table 3. Students' Perceptions of Participation & Interaction while Using InScribe

Item	Agree	Neutral	Disagree
The use of the InScribe Community motivated me to actively participate in my classmates' discussions.	9	9	21
The use of the InScribe Community made it easier for me to be more engaged with my classmates.	9	18	12
The use of the InScribe Community increased my interaction with my instructor and tutors.	15	18	6
The use of the InScribe Community increased my interaction with my classmates.	9	15	15
The use of the InScribe Community motivated me to seek help from tutors, classmates, and the instructor.	21	12	6
The use of the InScribe Community motivated me to offer help to my classmates.	12	15	12

For the fourth category: students' perceptions of belonging while using InScribe, 15.38% felt engaged in the InScribe community discussions, while 38.46% did not. Similarly, 15.38% felt a sense of community while using

InScribe, while 38.46% did not. In addition, more students indicated that they did not feel connected to their classmates while using InScribe (30.77% compared to 15.38%) (see Table 4).

Table 4. Students' Perceptions of Belonging while Using InScribe

Item	Agree	Neutral	Disagree
I felt actively engaged in the InScribe Community discussions.	6	18	15
I felt a sense of community while using InScribe Community.	6	18	15
I felt more connected to my classmates while using the InScribe Community.	6	21	12
I felt that I was a member of a community while using the InScribe Community.	9	18	12
The use of the InScribe Community increased my confidence.	9	15	15

Regarding the students perceived benefits of using the InScribe Community in the class, students' responses to the question "In your opinion, what are the benefits of using the InScribe Community in the class?" were divided into three categories: Connection, Seeking Help & Other. The following table (see Table 5) provides a sample of students' responses.

Table 5. Sample of Participants' Responses to the Benefits of using InScribe

Connection	- Can be used as a good resource to connect with others to help guide you through those challenges. - Communication - It helps students connect with others and help each other out.
Seeking Help	- Get help on homework questions - Having further reach with questions or concerns you may have; although I haven't actively participated in the forum, I can see how it is beneficial to other students in my class - Seeking help on topics that are a bit challenging.
Other	- I felt that the Inscribe works for some but it's almost impossible to get through the sessions due to being set back from getting a question wrong. - it was just ok. It is just another extra tool and place to go and keep track of in a myriad of discussion boards and other tools - I think that it is useful for TA's to help with specific problems, but it's not able to be used to interact with classmates as much in a math class vs something like an English class when you're responding to prompts.

Lastly Students' responses to the question: In your opinion, did the use of the InScribe Community make you feel part of a community? Please explain, some students indicated that they felt part of a community while others indicated that they did not. The following table (see Table 6) provides a sample of students' responses.

Table 6. Sample of Participants' Responses of Feeling Part of a Community

Yes	- Being able to provide feedback if and when applicable. Most of the time, the quick turnaround from instructors/other students I am certain was extremely helpful to them. Most of the questions I noticed on the feed have immediate responses. - I did not use it enough but can see it as a beneficial resource that promotes community. -Yes. The Inscribe community was supportive, cooperative and very helpful in answering many of the questions I asked.
No	- Nope. I love online learning because there are different ways I can participate and be a part of the community. I hate being forced to try and help people in a class I am struggling with and they may be struggling with. Like hey, I cannot help you with these math problems but I will be your cheerleader. Go you today, you are amazing and good luck with math! At least in the other communities of my online classes it was more open discussion and my teachers taught so we discussed the class and analyzed what we were taught. - No, I was too focused and stressed out wanting to get my work done - It did not. I think it is a tool for the class, but not a community feature for this type of class.

Conclusion

In the mathematics classroom, educators seek to identify tools and resources that can help students navigate the challenges they may face while learning new mathematical concepts. This pursuit can be achieved with greater ease when barriers of communication between learners and instructors are removed. VLCs are believed to assist in removing such barriers. If students can access collaborators in real time and anticipate immediate responses to relevant questions, then it is reasonable to assume that learning objectives can be achieved with greater success. This research focused on the impact of integrating the virtual community InScribe into the online mathematics classroom.

The significance of this study lies in its exploration of undergraduate students' perceptions regarding the integration of InScribe within the mathematics classroom, an area that has seen limited research. The results indicated that most students in this study expressed a positive attitude towards the use of InScribe in the mathematics classroom. In addition, it indicated that students believed that the use of InScribe had a positive impact on their learning, their classroom participation and interaction with tutors and instructors.

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Team Teaching with AI to Promote Multiple Perspective-Taking

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Abstract: Given the complexity of the world for which universities are preparing students, faculty must go beyond teaching their specific subject matter and strive to expand students' abilities to think critically, solve problems, and embrace situations from various perspectives. The ability to incorporate multiple perspectives in course design is imperative for two reasons: 1) the movement to de-colonize curriculum implies that professors seek divergent perspectives, alternative explanations and examples, and studies with converging or conflicting conclusions; 2) pedagogy that promotes multiple perspective-taking also develops problem-solving and teamwork skills which repeatedly show up among the most important factors that employers seek in new graduates. Artificial intelligence (AI) tools can be employed by faculty and instructional designers to develop more sophisticated approaches to designing and assessing learning activities and by students to expand the ways that they frame and research topics. This paper describes a pilot project conducted by the author over two years to use several AI tools to develop and refine a complex multi-week classroom simulation designed to strengthen students' abilities to seek, embrace and design effective communication with various stakeholders during a major organizational change.

Keywords: Artificial intelligence, instructional design, simulations, pedagogy

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Introduction

Given the complexity of the world for which universities are preparing students, faculty must not merely teach their specific subject matter, but they also must strive to expand students' abilities to think critically, solve problems, and embrace situations from a variety of perspectives (Mintz, 2022; Finley, 2021). This poses many conceptual and logistical challenges, especially because more courses are being taught online, in large classes, or by early-career professors or teaching assistants – all factors that limit the kinds of effective and interactive dialogue and expert facilitation that promote these higher-level outcomes.

One effective pedagogical practice to promote students' ability to work in diverse groups on complex problems is using simulations in which learners take active roles in negotiating a multi-layered problem. However, few professors have the time and skill to develop both the content of simulations as well as clear, fair, and efficient methods of assessing student learning and participation. Artificial intelligence (AI) tools can be harnessed to assist in developing the simulation problem, visual and data assets, rubrics, and feedback.

AI platforms do not replace the development and assessment roles of the professor but complement their approaches by their ability to rapidly generate alternative ideas and approaches and to draft materials based on specific criteria, increasing both effectiveness and efficiency. This may allow them to develop more complex and powerful teaching materials. Secondly, research demonstrates that most college students want to be exposed to AI in their courses, beyond its presence in computer science (Coffey, 2024). For these reasons, faculty should consider incorporating AI as a teaching partner, especially when attempting to embrace more complex pedagogical methods such as simulations.

This article describes a pilot project conducted by the author to use various AI tools to develop a simulation for a course in Communicating with Stakeholders, an undergraduate course in a degree program that prepares students for roles in corporate strategic communication. The goals, methods, and outcomes are discussed using a framework that scaffolds the ultimate objective of multiple perspective-taking.

AI as an Instant Teaching Team

Higher education has recognized the need to combat systemic inequalities and embrace diversity, equity, inclusion, and belonging as primary values. Both the course content and the communication behaviors of faculty are often critiqued for being racist, homophobic, and ethnocentric. Significant critiques about the source of valid content are being raised. Can anyone professor be prepared to provide the perspectives or address the needs of a diverse body of learners? Who decides which content is "correct" and whose perspectives to share? Critics of traditional approaches to instructional design point out that its systems engineering, positivist, and rational foundations do not promote critical perspectives or help designers challenge traditional Western, white, and patriarchal belief and power structures (Carr-Chellman & Reigeluth, 2002; Gayeski & Dashew, 2022; Nilikanta, 2006).

Beyond the goal of decolonizing the curriculum, pedagogy that promotes multiple perspective-taking also develops problem-solving and teamwork skills which repeatedly show up among the most important factors that employers seek in new graduates (Finley, 2021). "Neuroscience suggests that one key strategy may be taking the perspective of others. Indeed, many frameworks and tools for solving tough and complex problems are centered around the ability to take the perspective of others. Innovation frameworks start with taking the customer's perspective; collaboration and negotiation frameworks are centered around understanding others' viewpoints; and dialogue models recommend postponing judgment in order to take different perspectives for solving numerous challenges from business issues to marital problems" (Platt, 2021).

While most experimentation with generative AI platforms such as ChatGPT has been in the service of creating textual content, there are some documented examples of using it to do role-plays or as a consultant. Ammirati (2024) has produced a video that explores how ChatGPT can help business students and professionals by acting as a "professional sounding board, providing diverse perspectives that are invaluable in todays' dynamic world. David Monis-Weston (2023) created a roleplay for teacher training in which students take the role of a middle school teacher dealing with a challenging set of students, played by ChatGPT. Figure 1 is an excerpt from one run of the simulation during which the teacher is trying to get students to line up to go to another room. It shows both how the class reacts to the teacher's directions as well as an analysis of what the teacher could have done better. This exercise allows student teachers to take different approaches and discover the likely reaction of their class, understanding how different perspectives can be brought to a challenging situation.

Student teacher

Everyone lines up please.

Chatbot response

"Oi, why should we listen to you, you're just another temp!" shouts one of the more disruptive boys, a grinning 14-year-old named Jack. He is one of the instigators of the bad behaviour in the group, always looking to stir the pot. He leans against the wall casually, arms folded across his chest, clearly not intending to line up.

"I'm not standing next to him!" complains a girl named Mia, pointing at a quiet boy named Henry. She's one of the quieter ones, but her tone is filled with disdain.

The complaints continue, causing a buzz of chatter and laughter among the students. The line is more of a disorganized crowd than anything else, with the disruptive students scattered throughout, egging on the others to join their rebellion against the teacher's control.

Chatbot analysis

The teacher's instructions were clear but lacked the assertive tone needed to take control of a class like this. By not addressing the students by their names and not showing enough confidence, the teacher has allowed the disruptive students to control the situation. The teacher needs to remain calm and composed but also demonstrate authority. A good start would be to address the disruptive students by their names and remind them of the school behaviour policy. The teacher could also use non-aggressive language to explain what they expect from the student.

Figure 1. Example of a Chatbot Role-Play

Typically, faculty who are new to working with AI are advised to create prompts that ask it to act as a tutor or lesson designer. For example: "You are an expert professor in leadership theory; please design an introductory lesson……". A more powerful way to leverage AI is inspired by Jaron Lanier, the "Prime Unifying Scientist" at Microsoft who asserts that AI is not an artificial person, but rather a set of social collaborations trained on content by thousands of individuals (Lanier, 2023). Using Lanier's concept, the author set out to use several AI platforms to serve as a teaching team or advisory board to provide multiple perspectives through a multi-week simulation.

Developing the Simulation

The development of the simulation began with the learning objective of enabling students to apply creative and analytical skills to create a comprehensive communication plan for stakeholders during a significant business change. Since the process of using an AI large language model for building this kind of extensive exercise was new to the author, several rounds of prompts over approximately 30 minutes were tested. The first goal was to ideate a fictitious business and a change that would impact many of its stakeholders in different ways. Ideally, the scenario would be both challenging and relatable to my learners.

The first fictitious example suggested by ChatGPT centered around a huge multinational company with a technical change in product manufacturing. This example was overly complex, and the nature of the company would not be appealing to a group of 19–21-year-olds. Prompting ChatGPT to come up with a smaller business that would be more relatable to my students, our simulation for StudentStay Ventures (SSV) emerged.

The next step was to create a 5-page scenario that set up the situation and the challenges that SSV's young partners, friends who met in college, would have to navigate. This was done by expanding and editing the text provided by the AI platform.


StudentStay Ventures
Safe housing and fun friends for student short-term stays

Objective:

In this simulation, you will take the roles of a small startup company and several of its major stakeholders as it navigates some important business decisions about its growth.

About SSV

StudentStay Ventures (SSV) operates an integrated online platform that seamlessly connects college students with affordable housing and compatible friends for short-term stays in the Washington, DC metro area. It is privately held by 4 partners and 2 investors.

Figure 2 Screenshot of The Simulation Assignment

To make the assignment visually appealing, Microsoft Copilot Designer was used to create the company's logo and to find stock photos to illustrate the assignment document. These visuals would also be provided to the students to use as assets to incorporate into their reports and sample stakeholder messages.

To kick off the simulation with a bit of drama, the AI tool Visla was employed to produce a video clip that introduces the challenge. Upon pasting a few paragraphs of the simulation into its prompt screen, Visla wrote an original script and chose appropriate music and stock footage. The 45 second clip was created in under 4 minutes

- including subtitles so that the video is compliant with accessibility standards. The students loved it and were intrigued to dive in.

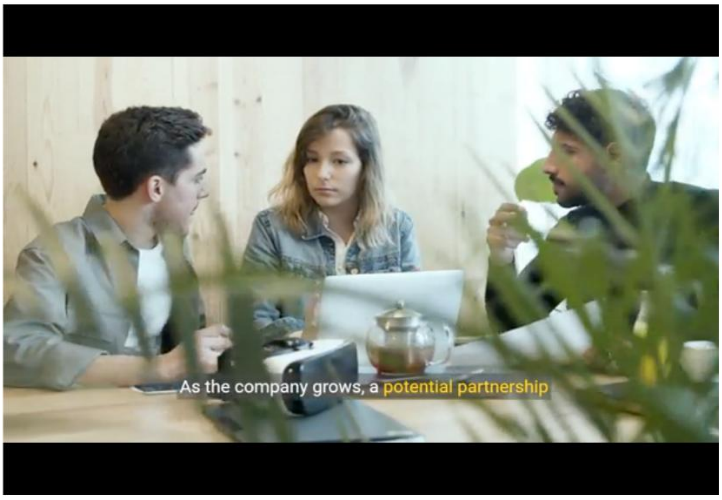

Figure 3 Still Frame from The Kick-Off Video Produced by Visla

Using AI As an Additional Reviewer

In addition to using AI to develop the pedagogical materials, students were also required to use various AI applications to get initial ideas for assignments. Part of the simulation assignment was to create sample messages to various stakeholder groups, using Microsoft Copilot to provide inspiration. Students were required to step into the shoes of stakeholders, map out their potential concerns and benefits, and create a series of social media messages. They were required to document their AI prompts and the generated response and then create their own final versions.

The author also offers both her own feedback and that provided by AI for the students. For example, pasting each student teams' social media strategies into Copilot and prompting it to provide its feedback based on the assignment rubrics, CoPilot provided clear and positive feedback as well as some areas for improvement. As might be expected, the author's assessment of the students' work did not always agree with that generated by the AI application, but this provided an excellent opportunity for the author to demonstrate multiple perspective-taking in action. Interestingly, the students readily embraced this method of critique and seemed much less defensive than their typical reactions to grading feedback.

Introducing and Managing Complexity

To add complexity and realism to this exercise, an additional challenge was designed to be presented about halfway through their work on the two-week simulation. While the idea of a data breach crisis was selected by the author, Copilot was used to develop the text of an email message the company's owners received from criminals who were demanding a ransom payment. Copilot was also used to develop the instructions and rubrics for the assignment. While the assignment is complex, especially because they need to integrate a new crisis communication plan alongside their plans for communicating their expansion, the assignment and grading mechanism are clear and transparent.

Using AI to identify divergent and convergent viewpoints

Students often need support in moving beyond the kinds of structured learning and memorization they experienced in high school courses. Particularly in courses similar to the one described in this paper, while there are certainly principles and theories that guide us, there are no right and wrong answers or pages in the text that spell out exactly how they should engage in strategic problem-solving or decision-making. Additionally, trends and technologies can render some textbook materials and journal articles out of date. For example, one topic covered in this course is the emerging trend of corporate activism. A specific question might be, “Should CEOs take a public stance on controversial social or political issues?”.

It's easy for students to use Google Scholar and our library search tools to find related research - and if they are told to cite 5 sources, the easy route is to find one article, look at its reference list, cite those supporting studies, and then try to defend one clear answer to the question. This approach leads them to be narrow-minded and defensive.

A tool that helps get out of that echo chamber of mutually reinforcing research is scite.ai. This platform allows the user to perform a search on a question or topic and it not only provides a quick overview with references; it also points out articles that both support and do *not* support specific results or opinions.

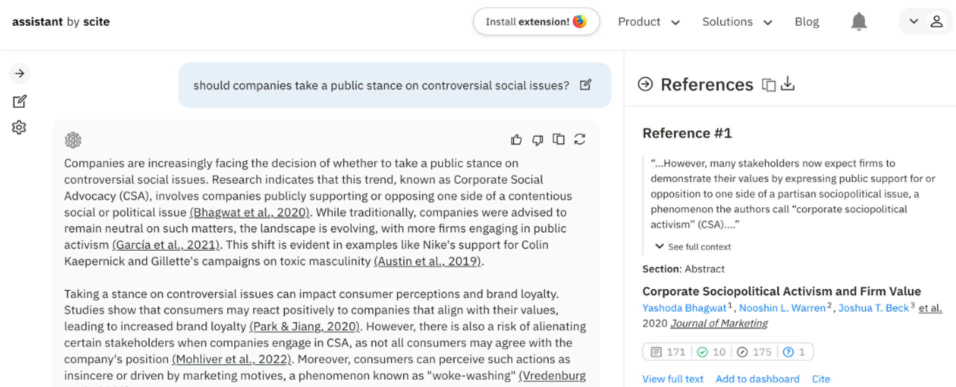

Figure 4. A Screenshot from Scite.Ai Showing References to A Topic, Including Citations

In this example, the topic is “Should companies take a public stance on controversial social issues?”. The box on the left summarizes the research it found, and the column on the right displays the citations behind it. For each citation, it displays some stats: for example, for the paper on Corporate Sociopolitical Activism it found:

- papers it was cited by (171)
- supporting statements indexed from those papers (10)
- mentioning statements we indexed from those papers (175)
- contrasting statements indexed from those papers (1)

We can also coach students to use ChatGPT in ways that broaden their perspectives. For example, the beginning of the Devil's Advocate prompt from a digital library of prompts created by Harvard University's Office of the Vice Provost for Advances in Learning is:

> You are a friendly helpful and warm AI team member who helps their teammates think through decisions and ideas. Your role is to play devil's advocate and you want to help the team. First introduce yourself to the student as their AI teammate who wants to help students reconsider or rethink decisions from a different point of view. Your focus is on identifying possible flaws, and testing all possible angles of a plan or idea… (ncwilson78, 2024).

Another example, the Sociological Imagination Activator prompt, could be modified for many different content areas:

> Stimulate students' sociological imagination by exploring a contemporary social issue from various sociological perspectives. Begin by presenting the issue and asking the student to consider it using concepts from their readings. Facilitate a discussion on how individual experiences are connected to larger societal forces, providing examples to deepen understanding. Challenge the student with scenarios requiring sociological analysis and encourage debates on societal adaptations to current findings in sociology. Assist the student in framing a research question on a chosen social issue, guiding their analysis using sociological theories and offering feedback on their findings and conclusions (ncwilson78, 2024b).

Next Steps: Simulating Interviews with Stakeholders

The author is preparing to teach with this simulation for the second time and is adding another element: a simulated interview with stakeholders coded in an application called Botpress.

Conclusion

College teaching can be a solitary activity. Those of us who were fortunate enough to have a good co-teaching experience or great TAs have experienced the joy and power of having other sets of eyes on student work or creative minds to brainstorm course design. The conclusions drawn from this pilot project are:

1. Using AI as a collaborator in teaching takes practice and does not necessarily save time when designing, executing or grading assignments, especially at first.
2. Students respond positively to multi-media and interactive assignments that simulate real-world challenges; they are engaged, and they retain the content and concepts that they are able to practice.
3. Students embrace the use of AI to provide them with alternative perspectives, especially those of stakeholders or actors who are different than themselves, and they appreciate the ability to practice in a safe space.

4. Student defensiveness to the professor's feedback seemed to be decreased when feedback from AI was presented alongside that of the professor
5. Rapid development of specific applications and prompts for instructional design are emerging which will make it much easier for professors to develop engaging simulations.
6. The challenges of AI continue to be centered on the accuracy of its output, as well as the ethics of sharing student and professor material with LLMs that use that content in their learning.

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Active Learning in Academic Museums

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Abstract: Art museums collect, preserve, and exhibit art and artifacts and serve as venues for exploring artworks in a social context. Museums since the eighteenth century have emphasized exhibiting art to the public and today their missions focus on both exhibiting and reaching audiences, showcasing museums as welcoming learning environments. These spaces, and particularly their academic counterparts, are essential to students of art, art history, art education, and museum studies. Yet recent scholarship has shown that museums can facilitate learning for students in a variety of fields, offering an array of perspectives, as well as opportunities to consider contexts of production, acquisition, and display. In university museums, students can synthesize and apply knowledge and skills acquired in classes, translating academic instruction into the kinds of adaptable, culturally situated, real-world applications sought by many employers and post graduate committees. Interacting with museum professionals also provides students with opportunities to learn about some of the ways that marketing, promotion, and public outreach serve to establish museums as community spaces, and these skills are also transferrable in a variety of professions (American Alliance of Museums, n.d.). Moreover, engaging with objects in university museums increases students' confidence about visiting and conducting research in cultural venues, expanding horizons of possibility for students in both regional and global contexts. This paper explores some of the ways in which active learning and engagement in university museums enhances visual literacy, critical thinking, and a range of transferable academic and professional skills.

Keywords: Art, Museum, Education, Learning, Pedagogy

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Introduction

Recent scholarship has shown that museums serve as sites of active learning for students in a variety of fields, offering in person and online encounters and an array of cultural perspectives, as well as opportunities to consider contexts of production, acquisition, and display. In university museums, students can synthesize and apply knowledge and skills acquired in classes, translating academic instruction into the kinds of adaptable, socially engaged, real-world applications sought by many employers and a host of post graduate committees. For students in art related fields, these experiences can enrich grant, artist residency, and graduate school applications. For students in any number of fields, museum learning, examining objects, and interacting with museum professionals can enhance critical thinking and visual analysis as well as the ability to discuss diverse forms of human production in our increasingly visually oriented culture. Not surprisingly, engaging with objects in university museums increases students' confidence about visiting and conducting research in cultural venues, expanding horizons of possibility for students in both regional and global contexts.

Figure 1. Students Conducting Visual Analysis in the Dishman Art Museum, Lamar University, 2024

This paper explores active learning in university museums, considering the ways in which museum learning and engagement can foster visual literacy, critical thinking, and a range of widely applicable academic and professional skills. In considering the vital role of academic museums, this discussion is approached from the perspective of an educator and considers a new Museum and Gallery class being taught at Lamar University, where our campus museum serves as a significant site of active learning.

Method

In spring 2024 the Lamar University Department of Art & Design began offering a course on Museums and Galleries. Our class started out with a simple approach—expanding engagement with our campus museum beyond what could be achieved in a couple of visits, as would ordinarily be the case in most art history classes. After review of innovative programs in the U.S and abroad, I decided to craft our schedule of course activities based on the feedback of students, alumni, and regional museum and gallery professionals, as well as alumni who had gone on to museum studies programs. With their guidance and information about their experiences with the transformative effects of museum learning, we designed the course around increasing engagement, awareness, and confidence conducting research in museums. Although our class did fieldwork and research in a variety of regional museums, our primary base of operations—and the focus of this paper—was the Lamar University Dishman Art Museum. We began our course by covering a brief history of museums and the collecting of art and artifacts with a focus on the developments, over time, that led to current missions and the desirability of expanding access and engagement in museums. We practiced active learning through close looking guided by activities adapted from art, art history, and museum education resources, including Smarthistory, Art History Teaching Resources online, and various museum websites.

We explored the material properties, themes, historical and cultural context, and social relevance of artworks on view. Prompts were provided to guide series of questions and to get students thinking about the elements of art and principles of design. Questionnaires were alternated to demonstrate that a variety of different approaches may be taken to formal analysis. We enriched these art historical investigations by examining the curatorial decisions (exploring processes of selecting, composing, and installing works of art) as well as considering some of the reasons why exhibition curators might have paired certain works to create specific visual dialogues. Our studies thus combined traditional art historical methods with active object and context analysis, considering also the ways in which exhibitions signify various levels of meaning using images, objects, arrangements, and educational text. For the final projects, students each wrote and submitted an exhibition proposal and presented on their proposal orally and visually with digital images they had curated for this purpose. We also discussed the ways in which such skills are applicable to many professional, civil, and academic contexts in which it is important to present, persuade, and demonstrate. Our methods were repeated when the class was taught a second time with a different group of students in spring 2025.

Results

Our course experience aligned with research that university museums are particularly suited to active learning due to their ability to facilitate close-up study of artworks. Our campus museum was exceptionally condusive to experiential learning, which according to Dee Fink, David A. Kolb, and other prominent scholars " involves a direct encounter with the phenomena being studied rather than merely thinking about the encounter" (Kolb & Smith, 2024). In addition to exploring art and artifacts in relation to history, culture, and creative processes, the active learning made possible in our campus museum has been particularly successful as a context to explore relationships between individual and group engagement, the construction and interpretation of meaning, and the social relevance of making and exhibiting art. Our museum experiences thus promoted higher order thinking in the areas of the human dimension, caring, and learning how to learn. Each of these outcomes aligns with and demonstrates the relevance of artworks and exhibitions to learning in a variety of different fields. Likewise, the exhibition proposals students produced applied skills in ways that make explicit their transferability to other fields and contexts where success relies upon adept persuasion supported by images.

The course was largely successful when taught for the first time in 2024. Of the 20 cohorts that year, 75% achieved 85% or higher on graded activities and all but two students reported that class activities increased their confidence conducting research at museums and interacting with museum professionals. Although at the time of this writing in 2025, that cohort of 14 students has shown all indications of comparable or improved results on lower stakes class activities throughout the semester. This cohort too has already begun expressing their enthusiasm for museum learning and for making connections between museum exhibition design and promotional materials to other art and graphic design fields, as well as general industry and civil and academic work.

Discussion

Museums: History and Practice in Campus and Community Learning

Museums have long been established on university campuses and in sizable cities. Today, museums can be found in communities of various sizes with the resources or patrons to support the acquisition and conservation of art, artifacts, and archives, serving also as sites of cultural gatherings and community outreach.

Many early museums were private affairs, displaying objects for personal pleasure and small groups of elite visitors. In stark contrast, museums since at least the eighteenth century have emphasized exhibiting art for public enjoyment and education (Longman, 1996, p. 8). Hints of elitism are still associated with museums in the public consciousness, however, and many museums seek to reframe public perceptions and increase participation in museum experiences. Museums of the twenty-first century are multifaceted and their missions focus on not only collecting and conserving objects deemed monetarily, culturally, and historically valuable but also exhibiting them to ever-expanding audiences as artifacts that document and preserve, celebrate and critique histories and cultures. As Ambrose, T. & Paine, C. note (1993), many museums house education departments designed to bring the public in and showcase museums as welcoming learning environments (p.16). These spaces, and particularly their academic counterparts, are essential to students of art, art history, and art education, whose research and creative activities benefit greatly from object and archival research as well as real time engagement with art. For these and other students in a variety of fields, such engagement also provides opportunities to learn from working with professionals in careers that serve historical, cultural, and community engagement missions.

As with museums of various forms, sizes, and institutional missions, university museums provide opportunities to experience and learn about the art and artifacts of the past and present and to learn from trained professionals who can offer insights into the relevance of museums to civic engagement. For many academic and community stakeholders, campus museums also provide unique opportunities to engage with art and its history in ways that resonate with lived experience, serving as sites of discovery and active, real-time learning.

Because of their proximity to student’s daily activities and university experiences, academic museums are thus vital resources. This is particularly so in regions with limited access to community museums. Even where museums abound, however, the significance of campus museums is assured by their integration with institutions of higher learning, where access and education are primary goals. Campus museums provide close-up encounters with objects of artistic, cultural, and historical significance, shaping a space for active and vibrant experiential learning.

Campus museums offer an array of perspectives and provide students and viewers in all fields with a site in which to consider contexts of production, acquisition, and exhibition as well as the politics of display. For studio and art history students especially, campus art museums provide opportunities to investigate the material properties of artworks and the very theme of materiality, as well as how materials can be used to convey or amplify meaning. These inquiries on site can also develop critical viewing and thinking abilities in general audiences. This paper considers two case studies in museum learning in two iterations of the Lamar University Museums and Galleries class; one conducted in 2024 and one in 2025.

In academic museums, students not only synthesize and apply knowledge and skills acquired in classes, they can also gain hands on experience through internships. Collaborative pedagogical models made possible between faculty, museum professionals, and students in academic museums also offer promising pathways for students learning about collecting and preserving art, the ways in which art offers insights into cultural beliefs and practices, and museum, education, and other nonprofit outreach. Conduits between the university and community, academic museums serve as vital resources for interfacing with various art and community stakeholders and potential career contacts.

Museums and Active Learning

As Judy Willcocks points out in her chapter The Power of Concrete Experience: Museum Collections, Touch and Meaning Making in Art and Design Pedagogy, *"*A new emphasis on student learning" has led to the reemergence of special collections as "a vehicle for higher education teaching and learning" (2015, Chapter Two, p. 44). As Willcocks notes, such practices are a perfect for art and design students, who must develop formal analysis and interpretive skills as they explore art making and display in a variety of media.

University museums are particularly suited to such experiential learning, which, as previously noted Dee Fink, David A. Kolb, and other prominent educators consider to involve a "direct encounter with the phenomena being studied" rather than abstract inquires in the classroom (Kolb & Smith, 2024). Given that museum learning facilitates the direct, in person exploration of art and artifacts leading to greater memory retention about their situation in relation to history, culture, and creative processes (Burnham, R. & E. Kai-Kee,79-80), active learning in campus museums seems to be particularly suited to promoting higher order thinking. Due to the kinds of artworks and artifacts being examined, such learning pertains not only to memory retention of facts but also concepts and nuances of meaning that include social relevance and the areas of the human dimension, caring, and even learning how to learn.

It should be noted that the creativity students engage with in academic museums tops the updated chart of Blooms' Taxonomy for higher order learning. It should be added, moreover, that the experiential learning made possible in campus museums forms the base of the pyramid of participatory—rather than passive—learning that studies show to better engage students and contribute to memory retention and the ability to transfer and apply related skills. As demonstrated by a National Art Education Association and Association of Art Museum Directors (2018) study of the museum experience in school children, direct experience and in-person analysis in museums bolsters creative thinking and problem-solving skills, and children who participated in active learning in museums scored higher on critical thinking tests.

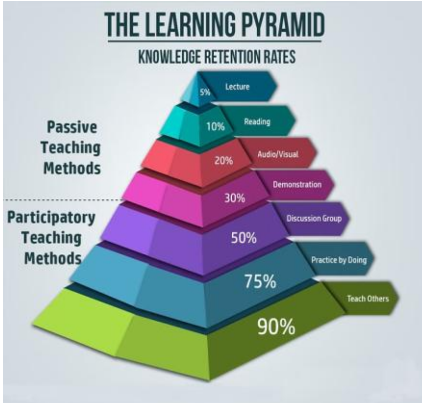

Figure 2. Learning Pyramid. Adapted from the National Training Laboratories Institute of Applied Behavioral Science Learning Pyramid on Science Outside.org https://www.scienceoutside.org/post/pushing-your-teaching-down-the-learning-pyramid

Synthesizing looking and learning in campus museums, college students apply learned skills in both academic and real-world setting. It stands to reason, then, that exploring objects and their contexts of display (which are their own forms of representation) can enrich undergraduate experiences and critical viewing and thinking abilities.

Many art and art history classes make use of campus museums as a matter of course to help students develop close looking, formal and interpretive analysis, and examination of art and its many afterlives. Building upon work conducted in such classes, our new museum course at Lamar University explores local and global connections, fosters collaboration, and promotes communication and critical thinking through object and context-based experiences. Although our class has engaged in these activities in several museums, our primary baes of operations in our campus art museum has been invaluable. Our activities in the Lamar University Dishman Art Museum have helped students prepare for internships and postgraduate positions, and also—given the museum's role in making art from a variety of sources available to students and community stakeholders—helped foster a sense of professional and community engagement.

Although the Lamar University class takes a local approach—an opportunity to promote regional as well as national and international art—the class participates in a global movement to reconnect the studies of art, art history, and lived experience. The Object-Based Learning Program at the University College London is an example of this movement on the global front. According to their oft-cited website (UCL, n.d.), the university considers the academic museum to be a site of "personal meaning making" where students can "develop academic and transferrable skills such as teamwork, and communication, analytical skills" as well as "practical observation [and] drawing."

The University College of London (UCL, n.d.), conducted studies that suggest direct encounters and hands on museum learning resonates with students in ways that contribute to the "long-term retention of ideas." Indeed, as Kolb and Smith have elaborated (n.d.) , experiential learning such as can be conducted in these museums involves 'experience or a direct encounter with objects or phenomena, reflection upon the encounter, generalization of ideas leading to higher order thinking, and application of related skills in a variety of real-world contexts.' Since object-based learning instills skills that are valuable in a variety of contexts in academia and beyond, many educators are exploring ways to more fully engage with campus museums.

Figure 3. Students Conducting Visual and Thematic Analysis and Engaging in Group Discussion in the Dishman Art Museum, Lamar University, 2024. *Legacy: The Art of Lowell Daunt Collins and Michael Roqué Collins,* Jan.-March 2024.

Case Study One: 2024

In spring 2024, when the Lamar University Department of Art & Design began offering a course on Museums and Galleries, we embarked on the course with a simple approach. We wanted to increase our active learning by expanding engagement with our campus museum beyond what could be achieved in a couple of visits, as would ordinarily be the case in most art history classes. After researching innovative programs in the U.S and abroad, I decided to develop the course based on a combination of regional and global approaches that considered the insights of students, alumni, and regional museum and gallery professionals, as well as alumni who had gone on to museum studies programs.

With the guidance of these inquisitive students and qualified art and museum professionals, we began learning about the history of museums and collecting, as well as the histories of our regional museums and our university museum, helping students learn the goals of why these institutions were established and what their roles have been in our region. We also considered the developments that, over time, have led to updated museum missions focused on expanding access and student and community engagement. We conducted research of these and other museum websites, art history websites, as well as articles, books, and exhibition catalogs. But our primary means of study was close visual analysis and the consideration of how visual elements and the means of their display create and convey meaning and serve as sites of learning and community engagement.

Our 2024 class spent multiple class periods learning in the Lamar University Dishman Art Museum's temporary exhibition *Legacy: The Art of Lowell Daunt Collins and Michael R. Collins,* an artist who teaches in Houston and has connections to Southeast Texas. Due to the fact that our lecture hall is adjacent to our museum, we spent three class periods doing guided visual analysis of the artworks, for which students also spent additional class time individually analyzing and discussing their observations in small groups, and presenting both individually and in groups on select artworks. We were able to take time analyzing the visual aspects of the paintings and sculptures in the show and considering the ways in which the elements of art and principles of design enriched the exhibition themes.

Many of the works dealt with the ways that myth and legend aid in the human processing of tragedy and specifically the Holocaust and these ideas led students to consider the ways that art can engage viewers in individual reflection and in consideration of art as human production expressing a broad range of social concerns. Our class then turned to our annual fundraiser, transforming this art auction of student, faculty, alumni, and community artists it into an opportunity to learn to curate and hang an exhibition and engage with community in a student-friendly setting. We investigated our museum's permanent collection, which includes works by regional Texas artist, successful alumni, and art from as far afield as Africa and Oceania. We concluded our class by supporting our graduating art and graphic design students as they curated and exhibited their senior capstone projects in our annual thesis exhibition, learning more about exhibition. In these activities, students learned about exhibition design, considering how art is arranged for visual impact, creative and thematic dialogues, and to guide viewers as they move throughout the museum. Also of practical concern, we investigated the role of graphic design skills in the creation of educational and promotional exhibition materials.

As outlined in the Methods section of this paper, each of the students wrote and submitted an exhibition proposal and presented on their proposal orally and visually with digital images they had curated for this purpose. Our class also engaged in discissions about the ways in which such skills are applicable to many professional, civil, and academic contexts in which it is important to present, persuade, and demonstrate. As indicated in the Results section of this paper, the course was largely successful with 75% of students achieving 85% or higher on graded activities and the majority of students reporting that class activities increased their confidence in activities related to analyzing art, conducting research at museums, interacting with museum professionals, and engaging with others about art in community cultural venues. Similar methods were deployed with indications of comparable successes in 2025.

Case Study Two: 2025

In spring 2025 the Museums and Galleries class followed a similar path. Although at the time of this writing the class is still underway, all indications from low-stakes visual analysis and other active learning we have practiced indicate that students are on comparable success pathways. Our featured exhibition, with which we spent the most time conducing analysis and discussion, was a show of work by Evita Tezeno, a Guggenheim Award winning alumna from Port Aurthur, Texas who works in the Dallas area and has national representation (Luis De Jesus Los Angeles, n.d.). Guggenheim awards are highly competitive, and the organization (Guggenheim Organization, n.d.) describes the fellowships as "intended for mid-career individuals who have demonstrated exceptional capacity for productive scholarship or exceptional creative ability in the arts." According to Tezeno, her collage (cut-and-paste) paintings employ richly patterned hand-painted papers and found objects to depict a cast of characters and everyday scenes. These, she says, are inspired by her family and friends, her childhood memories, and the 20th century artists Romare Bearden, Elizabeth Catlett, and others that resonate with her experiences growing up in a predominately African American community. Because Tezeno is a successful alumna and agreed to give a talk in our museum and to spend extra time with our students, her exhibition, public reception, and campus discussions served as prime examples of success strategies, mentoring, social relevance, and community engagement through art. Tezeno's engagement with our students also emboldened them to participate in art career discussions that, as she pointed out, were previously not as open to diverse student bodies embarking on art world careers. The multiple class periods students were able to conduct visual analysis and to discuss the material choices and themes of Tezeno's art on view in the museum again helped students make important discoveries about art as a significant cultural practice and to consider some of the ways in which art conveys meaning through visual language. Throughout the semester students in this and other of the classes that joined us in some of our activities have expressed they're thanks to the university for bringing students in direct contact with an artist and her works and providing opportunities to participate in lively discussions about the work's artistic, social, and history-making relevance. Because we opened these activities up to community participation, they have also served as ways to engage students, campus, and community stakeholders who also appreciate being included.

Figure 4. Students Discussing Works of Art in The Disman Art Museum, Lamar University, 2025. *Evita Tezeno: Piece of My Heart,* Jan. 18-March 8, 2025.

Conclusion

In both cases studies, direct, active engagement and close examination of the material choices of the artists has served as our foundation. Our explanations of various pedagogical methods in the museum allowed us to also consider the effectiveness of various strategies, the experimental mindset of educators interested in outreach, and the context and framing of such discussions within regional and western academic traditions, as well as in relation to global practices.

Thes approaches to active learning opened discussions about how our methods might or might not be best applied to viewing art in a variety of cultural contexts. For example, the *Legacy* exhibition included works by Collins and his father, exploring father-son relationships, learning, and tradition, within modern art and related discourses. The exhibition also featured the kinds of African sculptures to which many modernists of the twentieth century turned for inspiration. Active learning in the Legay exhibition thus expanded our discussions to include the contested relationships between legacy, inspiration, and cultural appropriation; contexts of production, display, and interpretation; and colonialism and its reverberations.

Such discussions have become the class's most active and engaging feature and were also explored in Tezeno's exhibition and its emphasis on her art production in relation to her upbringing in Port Arthur. It took some coaxing initially, but our engagement with these artists and works fostered a spirit of inquiry among students, who became more confident and willing to discuss art with respect to multiple parties and perspectives. Although prompts were given to help guide students' inquiries into the ways that formal qualities of artworks might convey particular impact or suggest particular themes, students quickly gravitated towards the works that piqued their interest and to form discussion groups around such works.

Despite the tendency to move and to scroll through images quickly in our technology and device-driven culture, students in these classes had the opportunity and learned the value of slowing down to analyze content and consider potential interpretations. They engaged in in-depth discussions about why the artists might have made particular aesthetic choices and why curators might have paired certain works to form particular artistic dialogues. Yet, the student dialogues have emerged as a key, community-building aspect of the class that has seemed, perhaps, most significant in the post-pandemic context.

Just as students have enjoyed investigating material and thematic properties, they have thrived peering behind the scenes and learning how to lay out and effectively install and exhibition. Active learning in our campus museum has helped students understand in both theoretical and practical terms what is involved in curating a body of work—knowledge with real-world application that also helps prepare them for their senior thesis projects. In addition to practical matters such as the career pathways and readiness that concern many students and parents about art related studies, engagement with art and community in our campus museum has inspired confidence and enriched university experiences, fostering a true sense of empowerment and community-mindedness.

Recommendations

By engaging in active learning in our university museum, students in the Lamar University Museums and Galleries class have begun gaining practical, hands-on, confidence-building experience. Based on these experiences, it is recommended that for the next iteration of the class—or for other courses developed—to even more actively engage students with art in context. It is also recommended that more consideration be given to the ways that these inquiries that can help students obtain internships and embark on career tracks in art or other fields that rely upon visual information. Active learning in museums can be demonstrated to help students feel empowered and to understand that museums are for them. It can also help students translate academic learning to real-world experience and to learn about the many intersecting career options to explore that relate to museums.

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Domain-Specific Applications of Virtual Reality in Public Health Training: Enhancing Skills, Knowledge and Engagement

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Abstract: Virtual reality (VR) is revolutionizing public health training by providing immersive, interactive, and experiential learning across various specialized domains. Traditional training methods often lack realism and fail to fully prepare professionals for complex health challenges. VR offers a solution by simulating real-world scenarios in epidemiology, infectious disease control, mental health, environmental health, and maternal and child healthcare, enhancing decision-making, skills development, and competency. This study employs a literature review methodology, analyzing current applications of VR in public health training, its effectiveness compared to conventional methods, and existing challenges. Various case studies and empirical research were reviewed to evaluate VR's impact on learning outcomes, engagement levels, and preparedness in different public health domains. Key metrics such as knowledge retention, skill acquisition, and user experience were examined to assess VR's effectiveness. Findings indicate that VR-based training significantly improves learning retention, enhances problem-solving skills, and provides a safe environment for practicing complex procedures. Additionally, it fosters deeper engagement, allowing trainees to experience high-stress scenarios without real-world risks. However, barriers such as cost, accessibility, and ethical concerns remain significant challenges to widespread adoption. The implications suggest that VR has the potential to standardize and scale public health education, particularly in resource-limited settings, by offering cost-effective and repeatable training experiences. Future directions should focus on integrating artificial intelligence for adaptive learning, expanding VR applications in telemedicine, and developing policies for ethical and equitable implementation. As technology advances, VR is expected to become a fundamental component of public health workforce training and capacity building.

Keywords: Virtual Reality (VR), Public Health Training, Epidemiology and Disease Control, Environmental Health Simulation

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Introduction

Public health is a multidisciplinary field concerned with protecting and improving the health of populations through education, disease prevention, emergency preparedness, and policy development. Its domains encompass areas such as infectious disease control, mental health promotion, disaster response, health education, and environmental health (Boulos et al., 2017). Effective training across these domains is essential to ensuring that public health professionals are prepared to address both routine and crisis situations. However, traditional educational methods in public health often lack the interactivity, engagement, and realism needed to fully prepare practitioners for complex, high-pressure scenarios (Bugli et al., 2021; Sharma et al., 2017). As a result, there is a growing interest in integrating advanced technologies to enhance public health training. Among these technologies, Virtual Reality (VR) has gained significant attention as a transformative tool for education and preparedness (Matamala-Gomez et al., 2020; Pallavicini et al., 2022).

VR creates immersive, three-dimensional environments that simulate real-world experiences, enabling users to practice decision-making, critical thinking, teamwork, and crisis management in a controlled and safe setting (Molka-Danielsen et al., 2018). Its applications in public health have expanded across various domains:

- In emergency preparedness, VR simulations such as those developed by Bugli et al. (2021) and Luo et al. (2024) have been used to train first responders and public health personnel for infectious disease outbreaks and disaster management.
- In mental health and psychological resilience, VR exercises have proven beneficial for promoting emotional well-being and coping strategies during periods of crisis, such as the COVID-19 pandemic (Menhas et al., 2023; Singh et al., 2020).
- For community engagement, VR platforms like VRGIS have been employed to enhance public participation in health campaigns and environmental health initiatives (Boulos et al., 2017).
- In remote health education, VR has supported distance learning and rehabilitation through telemedicine, especially during lockdowns and travel restrictions (Matamala-Gomez et al., 2020; Namkoong et al., 2022).

Despite these advances, significant barriers remain. High technological costs, limited accessibility in low-resource settings, and the lack of standardized evaluation frameworks hinder the full integration of VR into public health training programs (Pallavicini et al., 2022; Sharma et al., 2017). Addressing these challenges is crucial for ensuring that VR can be scaled effectively across diverse public health settings.

In light of these developments, the following research questions guide this study:

1. How can domain-specific applications of VR improve practical skills, emotional resilience, and engagement among public health professionals?
2. What are the key barriers to implementing VR training solutions across different public health domains, and how can they be mitigated?
3. What contributions has VR made to advancing education and training in specific public health fields such as emergency preparedness, mental health, and community engagement?
4. What future strategies can enhance the scalability, affordability, and long-term impact of VR in public health education and workforce development?

By systematically examining these questions, this paper aims to consolidate current research on VR applications in public health and to highlight opportunities for expanding its impact in addressing public health challenges.

Background of Study

In recent years, Virtual Reality (VR) has gained increasing relevance in the field of public health due to its ability to simulate complex, domain-specific scenarios that are otherwise difficult to reproduce in traditional training settings. Unlike conventional learning methods that rely on lectures or static content, VR creates immersive, interactive environments where learners can safely practice skills relevant to public health challenges from infectious disease control to community outreach and psychological resilience (Bugli et al., 2021; Luo et al., 2024).

VR systems function through a combination of hardware such as headsets and motion sensors and software designed to replicate specific training contexts. These systems are categorized into non-immersive, semi-immersive, and fully immersive platforms, each offering varying degrees of realism and user interaction (Pallavicini et al., 2022). Fully immersive VR, in particular, has shown great potential in enhancing skill acquisition, decision-making, and user engagement in high-risk domains like emergency preparedness and crisis management (Sharma et al., 2017).

The adoption of VR in public health has been driven by the need for domain-specific solutions. In emergency response training, for example, multi-user VR environments have been used to simulate natural disasters or pandemics, allowing professionals to develop critical thinking and coordination skills (Molka-Danielsen et al., 2018; Sharma et al., 2017). For mental health education, VR exercises help users build psychological resilience and practice self-regulation under stress, which is especially valuable in post-pandemic contexts (Menhas et al., 2023; Singh et al., 2020).

VR has also been integrated into telemedicine and remote learning frameworks to support training in underserved areas, expanding access to health education where physical resources are limited (Matamala-Gomez et al., 2020; Namkoong et al., 2022).

Beyond workforce development, VR has played a role in community engagement and public health literacy. Tools like Virtual Reality Geographic Information Systems (VRGIS) have been used to visualize environmental health data and deliver interactive health campaigns to the public (Boulos et al., 2017). These domain-targeted applications emphasize how VR can be adapted not just for professional training, but for broader public health interventions.

While the benefits are well-documented, researchers have also pointed to challenges including hardware cost, platform scalability, and limited long-term outcome data that restrict broader adoption (Pallavicini et al., 2022; Matamala-Gomez et al., 2020). As VR continues to evolve, addressing these constraints will be key to maximizing its impact across different public health domains.

Methodology

To explore the domain-specific applications of Virtual Reality (VR) in public health training, a systematic review methodology was adopted, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. This approach allowed for a rigorous and transparent process in identifying, evaluating, and synthesizing relevant literature.

Search Strategy

Searches were conducted across three academic databases; PubMed**,** ScienceDirect**,** and Google Scholar all focusing on literature published between 2017 and 2024. Keywords and Boolean operators were strategically applied to capture a broad yet relevant body of work, using terms such as *"Virtual Reality AND Public Health Training"*, *"VR Simulation AND Emergency Preparedness"*, *"Immersive Learning AND Community Health"*, and *"Telemedicine AND Virtual Reality"*. These combinations ensured that studies addressing different public health domains through VR technologies were included.

Inclusion Criteria

Studies were eligible for inclusion if they met the following conditions: (1) a clear focus on the application of VR in public health education or training; (2) the training context fell within a specific public health domain such as emergency preparedness, mental health, telehealth, or community engagement; (3) publication occurred between 2017 and 2024; (4) the article was written in English and published in a peer-reviewed journal or conference proceeding; and (5) the study presented empirical data using qualitative, quantitative, or mixed-methods approaches and reported outcomes related to training effectiveness or engagement.

Exclusion Criteria

Articles were excluded if they dealt exclusively with augmented reality (AR) or mixed reality (MR) without a VR focus, or if they were unrelated to public health training. Additional exclusions included opinion pieces, editorials, theses, dissertations, and studies lacking methodological clarity or empirical outcome data. Non-English publications and articles that were inaccessible in full-text form were also excluded.

Screening and Selection Process

An initial total of 116 records were identified. After removing duplicates, 109 articles remained. These were first screened by title and abstract, resulting in the exclusion of 56 articles due to insufficient relevance. The full texts of the remaining 53 articles were then assessed against the inclusion and exclusion criteria. Following this step, 43 articles were excluded for reasons such as a lack of domain specificity, absence of outcome reporting, or unrelated subject matter. Ultimately, **10 studies** met all criteria and were included for final analysis.

Data Extraction and Thematic Analysis

Key information was extracted from each included study using a structured data sheet. Extracted variables included study title, year, public health domain, VR system type, research methodology, major findings, limitations, and identified gaps. The data were then analyzed thematically to categorize findings according to the public health domain addressed such as emergency response, psychological preparedness, distance learning, and community engagement. This process allowed for synthesis of trends, contributions, and challenges unique to each application area of VR in public health.

Findings

This section presents the key findings from the systematic review, organized around the four research questions guiding this study. The table below summarizes the characteristics, methodologies, outcomes, and limitations of the selected studies, reflecting how Virtual Reality (VR) has been applied across various public health training domains. These findings offer practical insights for educators, program developers, and public health institutions seeking to adopt or scale VR-based training initiatives.

The findings are structured around four central research questions. The first explores how domain-specific VR applications enhance practical skills, emotional preparedness, and user engagement among public health professionals. The second identifies the key barriers to implementing VR in different public health contexts and outlines strategies for addressing these challenges. The third highlights VR's contributions to advancing training in targeted public health fields such as emergency preparedness, mental health, and community outreach. Lastly, the fourth examines future opportunities to improve the scalability, affordability, and long-term effectiveness of VR in workforce development and public health education.

Table 1: Summary of Domain-Specific VR Studies

Study Title	Year	Public Health Domain	VR System Type	Research Methodology	Major Findings	Limitations	Identified Gaps
Training the Public Health Emergency Response Workforce	2021	Emergency Preparedness	Multi-platform VR modules	Mixed-methods	Improved decision-making, preparedness, and skill retention	Platform dependency, variability in methods	Limited integration into public health curricula
Megacity: A Collaborative VR Environment	2017	Emergency Preparedness	Collaborative VR simulation	Qualitative case study	Enhanced teamwork and emergency response	Scalability and accessibility issues	Limited exploration of cross-disciplinary use
Virtual Reality Applications in Medicine During COVID-19	2020	Mental Health / Pandemic Response	Medical VR simulation	Systematic review	Strengthened emotional resilience and preparedness	Lack of long-term evaluation	Insufficient longitudinal studies
Use of Collaborative VR Simulation for Emergency Management	2018	Emergency Communication	Multi-user VR platform	Experimental study	Improved coordination and decision-making	User fatigue, limited comparisons	Need for VR vs traditional training comparisons
Significant Applications of VR for COVID-19	2020	Mental Health / Public Education	AI-integrated VR models	Qualitative analysis	Scalable mental health and education tools	Limited cost-effectiveness data	Lack of scalability research
Telemedicine and VR at the Time of COVID-19	2020	Telehealth / Rehabilitation	Telemedicine-integrated VR	Systematic review, case studies	Improved accessibility and innovation	Infrastructure challenges	Sustainability in low-resource settings
VR Training System for Public Health Emergency Preparedness	2024	Emergency Preparedness	Adaptive VR training framework	Model development and evaluation	Enhanced learning for outbreak preparedness	Lack of real-world validation	Insufficient empirical data
From Urban Planning to Public Health Applications	2017	Community Health	VRGIS tools	Case study	Improved public engagement and awareness	Access issues in underserved areas	Need for accessibility frameworks
Utilizing VR for Distance Physical Education	2022	Remote Learning / Physical Education	VR and online gaming	Survey-based study	Improved engagement and learning outcomes	Platform-specific findings	Challenges in global scalability
Association between COVID-19 Strategies, VR Exercise, and Health	2023	Mental Health / Physical Fitness	VR exercise platforms	Survey and observation	Improved psychological and physical health	Limited diversity in participants	Need for cross-demographic studies

RQ1: How can domain-specific applications of VR improve practical skills, emotional resilience, and engagement among public health professionals?

VR has proven to be an effective tool in building practical competencies, emotional preparedness, and learner engagement through domain-specific applications. In the context of emergency preparedness, Bugli et al. (2021) and Luo et al. (2024) demonstrated that VR simulations improved participants' ability to make decisions under pressure and retain critical response skills. The immersive nature of these simulations provided realistic practice environments that closely mirrored actual crisis scenarios.

In the domain of mental health and psychological resilience, studies by Menhas et al. (2023) and Singh et al. (2020) showed that VR-supported exercises enhanced users' ability to manage stress and anxiety, particularly during the COVID-19 pandemic. These platforms offered structured exposure to emotionally intense situations in a safe setting, which helped build resilience and coping mechanisms.

Engagement was another recurring theme across studies. Pallavicini et al. (2020) and Namkoong et al. (2022) found that the use of interactive, gamified VR elements significantly increased user interest and motivation. Learners were more likely to remain focused and immersed in training when simulations were contextually relevant and visually stimulating.

RQ2: What are the key barriers to implementing VR training solutions across different public health domains, and how can they be mitigated?

Despite its benefits, several challenges hinder the widespread implementation of VR in public health training. A common technical barrier identified across studies was the high cost of hardware and the need for compatible infrastructure, particularly in low-resource environments (Matamala-Gomez et al., 2020; Pallavicini et al., 2022). Limited access to stable internet, space for VR use, and maintenance support further complicates deployment. Scalability was another key concern. Studies such as Boulos et al. (2017) and Sharma et al. (2017) reported difficulties in extending VR-based programs to larger groups or across geographic locations, mainly due to cost and technical variability. Additionally, some users experienced fatigue or discomfort during extended VR sessions, which could hinder long-term adoption (Molka-Danielsen et al., 2018).

To mitigate these challenges, several studies recommended adopting modular, portable, and cost-efficient VR platforms tailored to local needs. Singh et al. (2020) emphasized the importance of fostering public-private partnerships to support infrastructure development. Furthermore, creating culturally relevant VR content and using lightweight mobile-compatible VR systems were proposed as practical steps to improve accessibility and relevance in diverse settings.

RQ3: What contributions has VR made to advancing education and training in specific public health fields such as emergency preparedness, mental health, and community engagement?

The reviewed studies offer strong evidence that VR has made meaningful contributions to training in several public health domains. In emergency preparedness, Bugli et al. (2021), Sharma et al. (2017), and Luo et al. (2024) demonstrated that VR enabled realistic scenario-based training, improving trainees' readiness for disease outbreaks, disaster response, and crisis management.

In the mental health domain, VR was used to deliver emotional preparedness training and stress management interventions. Menhas et al. (2023) and Singh et al. (2020) found that VR simulations helped users practice coping strategies and build psychological resilience, particularly during health emergencies such as the COVID-19 pandemic.Community engagement and public health awareness also benefited from VR applications. Boulos et al. (2017) used VRGIS tools to visualize environmental health data, enhancing public understanding of health issues and encouraging proactive behavior. Such tools are especially effective in translating complex information into accessible and engaging formats for non-expert audiences.

In remote education, VR supported health instruction and telemedicine training in areas with limited access to in-person resources (Matamala-Gomez et al., 2020; Namkoong et al., 2022), thereby broadening the reach of public health education.

RQ4: What future strategies can enhance the scalability, affordability, and long-term impact of VR in public health education and workforce development?

To unlock the full potential of VR in public health training, future strategies must focus on affordability, sustainability, and long-term outcome evaluation. One major recommendation across studies was the development of lightweight, mobile-compatible VR systems that require minimal technical infrastructure (Matamala-Gomez et al., 2020). These could support training in rural or resource-limited environments without sacrificing learning quality.

Another strategy involves integrating artificial intelligence (AI) into VR platforms to personalize learning experiences and adjust training intensity in real-time (Singh et al., 2020). Adaptive systems would not only improve user experience but also enable targeted skill development based on individual performance. Additionally, longitudinal research is needed to assess how VR training translates into real-world health outcomes.

While short-term improvements are well-documented, few studies have followed up on knowledge retention, behavior change, or system-wide health impacts over time (Pallavicini et al., 2020; Bugli et al., 2021). Addressing this gap will be crucial for justifying broader investment in VR-based education.

Finally, building interdisciplinary partnerships between technologists, educators, and public health professionals will ensure that VR solutions are both technically sound and contextually relevant, laying the groundwork for long-term integration into public health systems.

Discussion, Implication and Recommendation

The findings from this review reveal that Virtual Reality (VR), when applied within specific public health domains, can play a transformative role in training and workforce development. In areas such as emergency preparedness, mental health, and community education, VR simulations have consistently enabled public health professionals to engage in immersive, realistic training environments that promote practical skills, critical thinking, and emotional resilience. These domain-specific applications of VR foster experiential learning that cannot easily be replicated through traditional methods, especially when dealing with high-risk or emotionally demanding scenarios.

However, despite these benefits, the implementation of VR-based training solutions is not without its challenges. Cost remains one of the most significant barriers, particularly in settings with limited access to reliable infrastructure and technical expertise. Several studies highlighted the need for scalable systems, as well as the issue of user fatigue and platform variability, which can hinder consistent adoption. Additionally, while short-term training outcomes are promising, there is a lack of evidence on the long-term impact of VR on knowledge retention and real-world behavioral change, signaling a critical gap in the current research landscape. The implications of these findings extend to both public health practice and education. For professionals working in the field, VR offers a safe and repeatable method of rehearsing complex interventions, improving emergency responses, and enhancing collaboration across disciplines. In academic and training institutions, VR can complement traditional instruction by providing learners with highly engaging, context-specific scenarios that foster deeper understanding and active participation. Moreover, VR presents new opportunities for reaching underserved populations through mobile and remote learning platforms, expanding access to quality health education in regions where resources are scarce.

Moving forward, there is a need to develop affordable, mobile-compatible VR systems that can be tailored to various public health contexts. This should be accompanied by collaborative efforts between educators, software developers, and public health experts to ensure that VR content is both pedagogically sound and locally relevant. Institutions are encouraged to begin integrating VR gradually into existing training frameworks, ensuring that its use enhances rather than replaces foundational learning methods. It is also essential to conduct longitudinal studies to evaluate the lasting effects of VR training on performance and outcomes in real-world public health settings. Finally, supporting structures such as public-private partnerships and inclusive design processes will be vital for building sustainable, user-centered VR solutions that can adapt to the evolving needs of global public health education.

Conclusions

This review highlights the growing relevance and potential of Virtual Reality (VR) as a domain-specific tool for enhancing public health training. Across areas such as emergency preparedness, mental health, community engagement, and distance education, VR has shown remarkable capacity to improve skill acquisition, emotional readiness, and learner engagement. The immersive and interactive nature of VR allows public health professionals and trainees to engage with real-world challenges in simulated environments that are both safe and effective for experiential learning.

While the benefits are clear, the findings also underscore ongoing challenges, including high implementation costs, infrastructure limitations, and the need for long-term impact assessments. Addressing these barriers through strategic investments, cross-sector collaborations, and inclusive design practices will be critical to scaling VR solutions in a sustainable and equitable manner.

Ultimately, the integration of VR into public health education is not simply a matter of adopting new technology, it represents a broader shift toward more innovative, learner-centered, and resilient training systems. By building on current successes and addressing existing limitations, VR has the potential to become a transformative force in shaping the future of public health workforce development and community-based health promotion.

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University Students' Perceptions of the Use of Productive Artificial Intelligence: The Effects of ChatGPT on Assignment Processes

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Abstract: This study examines the perceptions of university students towards the use of generative artificial intelligence (GAI) in educational processes, especially in assignments. The main features of URM are human-like language abilities and the capacity to generate predictive content. In the study, descriptive research method, which is a quantitative method, was used to measure the views of university students towards the use of URM. The data collected from the participants in online format were analyzed through descriptive analysis. The findings of the study show that the majority of the students find it useful to use UIC tools such as ChatGPT in their assignments. While 63% of the students thought that using ChatGPT in assignments was useful, 21% were undecided and 16% expressed negative opinions. There was a high level of positive feedback that ChatGPT increased success in the assignment process, speeded up work and supported productivity. However, some students reported concerns about the impact of this technology on academic ethics issues and possible negative aspects on critical thinking skills. It was observed that students found the process of learning and using ChatGPT easy but needed integration and guidance support. In addition, the incentives from their social environment were found to have an impact on students' tendency to use the IWB. The study recommends developing guidance and training programs on the use of URMs, raising awareness about the accuracy of information, and encouraging ethical use.

Keywords: Generative AI, ChatGPT, Artificial Intelligence in Education, Student Perceptions

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Introduction

Generative Artificial Intelligence (GAI) refers to the approach that emphasizes the ability to model the relationships between high-dimensional data, particularly through neural networks (Goodfellow et al., 2016). GAI, by adopting the characteristics of human language, learns the structural and semantic complexities of language while performing tasks such as translation, content creation, and text completion (Brown et al., 2020).

GAI systems can analyze the complex structure of human language and generate text or speech by interpreting and making sense of this structure. One of the most recent examples of this technology is ChatGPT, a language model developed by OpenAI, capable of generating outputs similar to human language (Bhattacharya et al., 2023) ChatGPT stands out for its abilities to write text like a human, answer questions, generate summaries, and perform interlingual translation (Tlili et al., 2023). Generative AI technology is continually evolving, and in this process, it is acquiring a capability that is increasingly closer to human language usage.

Types of Generative Artificial Intelligence

Generative artificial intelligence (GAI) refers to a collection of algorithms and models designed to create new content. The most well-known types of GAI include Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and Large Language Models (LLMs).

Generative Adversarial Networks (GANs)

Generative Adversarial Networks (GANs) were introduced by Ian Goodfellow et al. (2014) as a form of generative artificial intelligence model. GANs are based on the competition between two neural networks: one generates data, while the other evaluates whether the generated data are real or synthetic. This adversarial process enables both networks to improve their performance over time, ultimately leading to the production of highly realistic data. GANs have been successfully applied in various domains, including the generation of human faces, artworks, and even new musical compositions.

Variational Autoencoders (VAEs)

Variational Autoencoders (VAEs) present a probabilistic approach to data generation (Kingma & Welling, 2013). VAEs are used to learn the underlying structures of datasets and to generate new data based on these learned representations. They are particularly effective in modeling data distributions and sampling new examples from these distributions.

Large Language Models (LLMs)

In recent years, Large Language Models (LLMs)—such as the Generative Pre-trained Transformer 3 (GPT-3)—have emerged as prominent models in the field of natural language generation (Brown et al., 2020). Trained on vast amounts of text data, these models are capable of performing a wide range of language-related tasks, including text completion, translation, and summarization. Remarkably, even when fine-tuned with relatively small datasets, LLMs can demonstrate impressive performance across diverse linguistic applications.

Generative Artificial Intelligence in Education

The use of AI in education offers multifaceted benefits such as personalizing learning processes, providing materials and feedback tailored to students' needs, conducting performance analyses, and supporting career planning. The opportunities enabled by this technology have the potential to enhance educational quality and make learning processes more efficient. AI technology allows for the design of learning environments that align with students' individual needs and differences. These systems can analyze learning processes and create personalized materials and environments (Baidoo-Anu & Ansah, 2023). For instance, by offering tests and instructional exercises designed according to students' levels, they can make the learning process more effective and efficient. Moreover, such systems can analyze student performance to identify learning difficulties and develop solutions to overcome them.

AI has the capacity to provide instant feedback to support learning processes. It can offer precise guidance to enrich students' learning experiences and, in addition to personalized learning environments, provide supplementary materials or data (Ahmed et al., 2023; Yılmaz et al., 2023). For example, it can supply structured learning materials to students who lack knowledge in specific areas, helping them address those deficiencies. AI can also analyze students' academic performance to assist them in planning their careers. These systems can identify students' strengths and weaknesses and propose customized strategies for their future goals. Furthermore, they can develop recommendations aimed at improving both teachers' and students' academic success, thereby making educational processes more effective.

Method

The descriptive research method, a type of quantitative research, was employed in this study. Descriptive research aims to identify and present the existing situation as it is. The researcher collects participants' opinions, attitudes, behaviors, or characteristics through a questionnaire. The data are analyzed numerically (using statistics such as percentages, frequencies, and means). If the purpose of the questionnaire is to determine certain characteristics, attitudes, or opinions of a group, this type of research is also referred to as a survey design (Creswell, 2014). Such studies aim to determine the general state of the phenomenon under investigation through the systematic collection and analysis of data.

The mixed research method was used as the research model. When evaluated within the scope of quantitative research, it corresponds to one of the existing quantitative approaches—the descriptive research method. This is a widely used research approach employed by researchers to collect data on a specific topic and to describe these data numerically. In this method, researchers typically use instruments such as surveys or scales to measure participants' attitudes, opinions, or behaviors (Creswell, 2014). Such studies aim to identify the general situation related to the research topic through the systematic collection and analysis of data.

Participant Profile

Table 1. Distribution of Students by Gender, Academic Level, and Daily Internet Usage

Feature	Category	N	%
Gender	Female	164	56.6
	Male	126	43.4
Academic level	1st Grade	65	22.4
	2nd Grade	53	18.3
	3rd Grade	109	37.6
	4th Grade	63	21.7
Daily Inernet Usage	Less Than 1 Hour	6	2.1
	1-2 Hours	29	10.0
	2-3 Hours	43	14.8
	3-4 Hours	62	21.4
	4-5 Hours	63	21.7
	More Than 5 Hours	87	30.0

Data Collection Device

As a result of the conducted literature reviews, the Generative AI Acceptance Scale developed by Yilmaz et al. (2023) (reliability coefficient = 0.97) and the "Attitude Scale toward E-learning" developed by Kisanga (2016) and adapted into Turkish by Biçer and Korucu (2020) (reliability coefficient = 0.78) have been utilized.

The draft survey form was sent to four different academics, experts in the field of Instructional Technologies, for expert feedback. Following the evaluation by the experts, necessary revisions were made, and the final version of the draft survey was completed.

A 23-item "Generative Artificial Intelligence Usage Survey" was used as the data collection tool in the research. The AI usage survey was collected online from students, transferred to a computer environment, and then organized. Descriptive analyses were conducted on the organized data using the Jamovi 2.3.28 software.

Descriptive analysis is a method that organizes data and summarizes its basic characteristics, aiming to understand the current state of the event or phenomenon under investigation. This method allows the researcher to structure and present the obtained data in a more systematic way (Neuman, 2014).

Results and Discussion

In this section, the findings regarding university students' perspectives on the use of ChatGPT in academic assignments are presented.

Performance Expectancy

Table 2. Descriptive Statistics for the Performance Expectancy Factor

Performance Expectancy	Frequency	Definitely disagree	Disagree	Undecided	Agree	Definitely Agree	$\bar{X}$ Arithmetic mean	SS Standard deviation
General	N	16	31	61	69	111	3.78	1.201
	%	5.6	10.7	22.3	23	38.3		

An evaluation was conducted based on 9 survey questions regarding students' "Performance Expectancy" related to the use of ChatGPT in assignments. In general, the prominent thoughts from these 9 survey questions are outlined below, and the corresponding percentages are provided in the table. In summary, the performance expectancy factor of ChatGPT has been found to be perceived positively by students.

%63 finds ChatGPT beneficial.

%74 believe that ChatGPT shortens the time required for assignments.

%49 indicate that ChatGPT increases productivity.

Effort Expectancy

Table 3. Descriptive Statistics for the Effort Expectancy Factor

Effort Expectancy	Frequency	Definitely disagree	Disagree	Undecided	Agree	Definitely Agree	$\bar{X}$ Arithmetic mean	SS Standard deviation
General	N	12	24	61	78	114	3.89	1.137
	%	4.1	8.2	21.2	27.1	39.7		

An evaluation was conducted based on 4 survey questions regarding students' "Effort Expectancy" related to the use of ChatGPT in assignments. In general, the prominent thoughts from these 4 survey questions are outlined below, and the corresponding percentages are provided in the table. In summary, the effort/expectancy factor of ChatGPT has been found to contribute positively to students' experiences.

65% of students say that learning to use ChatGPT is easy.

70% of students believe that ChatGPT is useful for assignments.

Ease of Use Conditions

Table 4. Descriptive Statistics for the Ease of Use Conditions Factor

Ease of Use Conditions	Frequency	Definitely disagree	Disagree	Undecided	Agree	Definitely Agree	$\bar{X}$ Arithmetic mean	SS Standard deviation
General	N	31	40	67	71	79	3.43	1.196
	%	10.7	14	23.3	24.4	27.3		

An evaluation was conducted based on 4 survey questions regarding students' "Ease of Use Conditions" related to the use of ChatGPT in assignments. In general, the prominent thoughts from these 4 survey questions are outlined below, and the corresponding percentages are provided in the table. In summary, although the ease of use factor for ChatGPT was found to be positive among students, the proportion of undecided respondents indicates the need for further work to provide access to solution-oriented resources.

65% of students believe that ChatGPT is compatible with other technologies.

27% of students are undecided about their ability to reach a solution when encountering a problem.

Quality/Efficiency

Table 5. Descriptive Statistics for the Quality/Efficiency Factor

Quality/Efficiency	Frequency	Definitely disagree	Disagree	Undecided	Agree	Definitely Agree	$\bar{X}$ Arithmetic mean	SS Standard deviation
General	N	35	47	70	65	71	3.30	1.291
	%	9.2	16.4	24.1	22.6	24.5		

An evaluation was conducted based on 3 survey questions regarding students' "Quality/Efficiency" related to the use of ChatGPT in assignments. In general, the prominent thoughts from these 3 survey questions are outlined below, and the corresponding percentages are provided in the table. In summary, while ChatGPT was found to increase efficiency in assignments, students' concerns about the quality of the information obtained cannot be overlooked. In this context, it is evident that there is a need for accurate and reliable information from ChatGPT.

31% of students are concerned that ChatGPT reduces the quality of information.

58% of students state that ChatGPT increases efficiency in their courses.

Social Influence

Table 6. Descriptive Statistics for the Social Influence Factor

Social Influence	Frequency	Definitely disagree	Disagree	Undecided	Agree	Definitely Agree	$\bar{X}$ Arithmetic mean	SS Standard deviation
General	N	23	30	85	73	78	3.52	1.203
	%	8	10.4	29.5	25	27		

An evaluation was conducted based on 3 survey questions regarding students' "Social Influence" related to the use of ChatGPT in assignments. In general, the prominent thoughts from these 3 survey questions are outlined below, and the corresponding percentages are provided in the table. In summary, while ChatGPT is considered a widely used generative AI tool, the proportion of students who are undecided about their social environment supporting the use of ChatGPT for assignments indicates the need for further studies in this area.

60% of students state that their friends use ChatGPT.

32% of students are undecided, so they are unsure about the social influence.

As seen in the findings of the survey data, more than 50% of the respondents have shown a positive attitude towards the use of ChatGPT in assignments across all factors. This result is consistent with the findings of other studies that support the role of AI-based systems in education. For example, according to a study by Holmes et al. (2019), AI tools, when adapted to meet students' learning needs, allow students to learn at their individual pace and help close learning gaps through personalized experiences.

It was stated that participants particularly benefited from ChatGPT's ability to simplify complex concepts, leading to time savings and allowing them to acquire better learning methods compared to traditional approaches. Additionally, it is argued that AI can facilitate the development of students' analytical, synthesizing, and critical thinking skills, rather than simply memorizing information (Holmes et al., 2019).

Recommendations

Students should adhere to academic integrity principles while using AI tools and should acknowledge that they have benefited from generative AI tools like ChatGPT. It is recommended that students use ChatGPT for acquiring information, researching concepts, and seeking guidance, but avoid using it directly for completing assignments. Students should evaluate the accuracy and source of the information provided by ChatGPT and must not overlook the development of their critical thinking skills during this process. Students, when seeking support from ChatGPT for their assignments, should ensure that the content is based on scientific sources and should remember that ChatGPT has the potential to provide inaccurate source information. Ethical training should be organized to ensure that students use generative AI tools like ChatGPT in compliance with ethical guidelines. Students should be made to understand fundamental principles such as proper citation, avoiding plagiarism, and using reliable content while using ChatGPT.

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Does Students' Gender affect their Success in Economics Classes?

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Abstract: The effect of gender on student success and learning in economics classes has been investigated by several researchers; however, they have not reached a consensus. To provide new evidence, we investigate this issue by controlling more variables and using an ordered logit. Positive, significant correlations exist between grades and the following variables: GPA, number of hours worked, number of economic courses taken previously, SAT scores, expected grade at the beginning of the semester, number of hours spent studying for the class, number of attended classes, instructors' use of graphs and equations, and interest in the course. The results of the analysis showed that gender, type of economics course, SAT score, number of missed classes, instructor, and number of hours worked at a job were significant factors in success in economics courses. After controlling for factors such as number of hours worked, SAT scores, number of missed classes, instructors, junior status, number of economics courses taken, type of class, and interest in the class, results showed gender was a significant factor contributing to learning and success as measured by grades. Specifically, this result implies that female students are 1.39 times more likely to get a better grade compared to male students.

Key Words: Gender, Success, Economics classes, Teaching.

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Introduction

Research has extensively explored factors influencing student performance and success in economics courses. Studies have investigated a wide array of variables, including student expectations (Ballard & Johnson, 2005; Owen, 2010), mathematical skills (Cohn et al., 1998; Cohn & Cohn, 2001; Hill & Stegner, 2003; Ballard & Johnson, 2004), instructor type and teaching methods (Watts & Bosshardt, 1991; Vachris, 1999; Colander, 2005; Goffe & Sosin, 2005; Laband & Piette, 1995; Robb & Robb, 1999; Porter & Serra, 2020), absenteeism (Romer, 1993; Durden & Ellis, 1995; Chan et al., 1997; Marburger, 2001; Cohn & Johnson, 2006), class size (McConnell & Sosin, 1984; Aries & Walker, 2004; Kara et al., 2021), student effort (Borg et al., 1989; Didia & Hasnat, 1998; Krohn & O'Connor, 2005; Lumsden & Scott, 1987; Park & Kerr, 1990), employment (Paul, 1982), seating location (Benedict & Hoag, 2004), personality type (Borg & Shapiro, 1996; Ziegert, 2000; Bisping & Eells, 2006), race (Stockly, 2009; Baderdm et al., 2021), and gender.

Investigations into the relationship between gender and student performance in economics have produced conflicting findings. Certain studies have demonstrated a trend of superior performance by male students (Siegfried, 1979; Lumsden & Scott, 1985; Lage & Treglia, 1996; Walstad & Robson, 1997; Borg & Stranahan, 2002; Gartner & Schneebaum, 2023), whereas others have identified no discernible gender effect (Williams et al., 1992; Greene, 1997; Saunders & Sounders, 1999; Ballard & Johnson, 2005). In a comprehensive analysis of previous research, Siegfried (1979) posited that gender-related differences, though not definitively proven, may originate in secondary education and extend into the collegiate level.

Building on Siegfried's 1979 research, numerous studies sought to clarify the gender gap in economics. Lumsden and Scott (1985) proposed that exam format influenced performance, suggesting females excelled in essay exams (averaging seven points higher) while males performed slightly better in multiple-choice tests (averaging four points higher), potentially due to a faster male learning rate. Lage and Treglia (1996) explored gender-inclusive teaching methods, which improved overall performance but also revealed persistent gender differences, with a notable increase in female achievement. Walstad and Robson (1997) analyzed multiple-choice results, attributing male students' advantage to sociocultural factors, cognitive variations, instructional methods, and the format of tests; they also used differential item functioning to identify gender differences. Borg and Stranahan (2002) further investigated the gender gap, confirming male outperformance and examining personality types (based on Kiersey-Bates temperaments) in macroeconomics principles. They concluded that gender impacts performance, but this effect varies based on personality.

Contrary to the research confirming gender disparities, several studies have found no significant gender effect in economics. For example, Williams et al. (1992), in their examination of intermediate macroeconomics, microeconomics, and statistics, reported neither consistent nor significant gender differences. While females outperformed males on essay sections of statistics exams, males did better on essay sections in macroeconomics and microeconomics. Similarly, females scored higher on numerical sections of microeconomics exams, but males outscored females on the numerical sections of macroeconomics, revealing no clear pattern. To test the hypothesis that females' superior verbal abilities might lead to better performance in verbal assessments, Greene (1997) analyzed his introductory macroeconomics classes over four years. He concluded that females did not outperform males in reading comprehension diagnostics, thus finding no support for the claim.

Saunders and Saunders (1999) explored whether the instructor's gender influenced gender disparities in economics. Analyzing data from introductory economics classes over six years (1984-1990) using multivariate analysis, they found no evidence that the instructor's gender explained any differences. Furthermore, Ballard and Johnson (2005) examined the relationship between grade expectations and gender, testing the idea that women might anticipate lower grades, potentially leading to self-fulfilling prophecies. While their research indicated that positive grade expectations correlated with success, the gender effect on final grades was minimal and statistically insignificant among 1,462 students in introductory microeconomics taught by the same instructor.

To summarize, the existence of a gender gap in economics remains inconclusive due to conflicting research findings. While earlier studies suggested male students outperformed females, more recent research indicates no significant difference in learning and success between genders. To contribute new insights to this debate, we will conduct a further investigation, controlling for additional variables and employing an ordered logit model, as detailed in the following section.

Data and Methodology

This study utilized two data sets gathered from surveys administered during final exams at the University of North Dakota and West Chester University. At the University of North Dakota, all instructors of principles of economics classes distributed the survey, and all students taking the final exam completed it. The same survey was given to students at West Chester University during spring 2004 final exams, with all but one instructor participating. Student grades for these courses were also collected. A total of 744 responses were recorded for the survey's thirty-four questions.

To analyze the influence of gender on economics learning, we employ an ordered logit model, as our dependent variable (grades) is ranked from A to F (best to worst) (Greene, 2008). This approach differs from Park and Kerr (1990), who utilized a multinomial logit model, due to the inherent ordinal nature of the grade variable. To analyze the effect of gender, the following model is estimated:

$$\text{Grade} = \beta_0 + \beta_i \text{ (class and student attributes)} + \text{error}, \qquad i= 1,\ldots, 34. \quad (1)$$

The dependent variable, Grade, is the final grades that students received, A, B, C, D, and F in their principles of economics classes. Class and student attributes include GPA, gender, age, course, university housing, number of hours per week worked at a job, number of mathematics courses taken, number of economics courses taken, SAT score, expected grade at the beginning of the semester, expected grade at the end of the semester, number of hours per week spent studying for the class, number of missed classes, textbook rating by student, understanding when the instructor uses graphs to explain a topic, understanding when the instructor uses equations to explain a topic, interest in the course, whether to recommend the course to a friend, university, instructor (eight dummy variables for nine instructors), year of study (three dummy variable for sophomore, junior, and senior), and dummy variables for reasons for registering in the specific class.

Results

Table 1 provides an overview of the sample characteristics. The sample consisted of 64.4% male students (479) and 35.6% female students (265). The average grade achieved was 2.64 out of 4, which falls between a B and C, and the mean GPA was about 2.98 (a B average). In terms of grade distribution, 22% of students received an A, 35% a B, 31% a C, and 12% a D or F. Due to the survey's administration in principles of economics classes, the student population primarily comprised first-year students (39%) and sophomores (around 40%), while the remaining 21% were juniors and seniors.

Table 1. Descriptive Statistics

Variables	Mean	Std. Deviation
Grade	2.64	1.011
GPA	2.98	.567
Age	19.83	2.515
Year in School : 1=Freshman 2=Sophomore 3=Junior 4=Senior	1.86	.850
# of hours per week worked	19.80	9.237
University housing: 1= Yes, 0=No	.57	.495
Number of mathematics courses taken	1.80	1.332
Number of Economics courses taken	1.65	1.978
SAT Score	1412.89	339.552
Expected Grade at the beginning of the semester	2.32	.994
Expected Grade at the end of the semester	2.31	.873
# of hours per week spent on studying for the class	2.79	2.143
Number of missed classes	4.57	4.247
Textbook rating	6.01	2.200
Understanding when the instructor uses graphs to explain a topic	7.10	2.275
Understanding when the instructor uses equations to explain a topic	7.17	2.202
Interest in the course	5.71	2.345
Usefulness of the course	6.26	2.273
Whether to recommend the course	.73	.447
Preference: 1=50 minute class 0=75 minute class	.77	.419
Preference: 1=Morning class 0=Afternoon class	.58	.494

Based on Table 1, a majority of students held jobs during the semester, working an average of 20 hours per week. The average student age was 20, with 90% being 21 years old or younger. Notably, 60% of respondents were enrolled in principles of microeconomics, while the remainder were in macroeconomics. Additionally, 57% resided in university housing. Half of the students had previously taken at least one math and one economics course. The average self-reported SAT score was 1413.

As shown in the table, average expected grades remained relatively stable from the semester's start to its end, with changes primarily occurring at the lower and higher ends of the scale. For instance, while 25% initially expected a D, this decreased to 18% by the end. Similarly, those expecting an A dropped from 13% to 9%. On average, students reported studying less than three hours per week and missing five classes per semester, with 62% missing four or fewer classes.

On a scale of one to ten, with one being "very poor" and ten being "excellent," students rated the textbooks around a six. They indicated improved comprehension when instructors employed graphs and equations to illustrate concepts. While students' overall interest in the class was moderate (5.71), a majority (approximately 60%) perceived the course as useful, and 73% would recommend it to a friend.

Regarding class registration, 60% of students cited convenience as their primary reason, 24% reported conflicts with other classes, 3% mentioned work conflicts, and another 3% noted personal conflicts. Only 10% indicated the instructor's reputation influenced their decision. Additionally, 77% of students preferred a 50-minute class over a 75-minute one, and 58% favored morning classes over afternoon classes.

Table 2. Correlations with Grade

	Correlation	**Significance**
GPA	0.60**	(0.000)
Gender 1=Female, 0=Male	0.04	(0.253)
Age	0.03	(0.381)
University housing: 1= Yes, 0=No	0.03	(0.498)
# of hours per week worked at a job	-0.11*	(0.021)
Number of mathematics courses taken	0.04	(0.232)
Number of Economics courses taken	0.10**	(0.007)
SAT Score	0.23**	(0.000)
Expected Grade at the beginning of the semester	-0.16**	(0.000)
Expected Grade at the end of the semester	0.03	(0.496)
# of hours per week spent on studying for the class	-0.09*	(0.023)
Number of missed classes	-0.22**	(0.000)
Textbook rating	0.03	(0.477)
Understanding when the instructor uses graphs to explain a topic	0.29**	(0.000)
Understanding when the instructor uses equations to explain a topic	0.24**	(0.000)
Interest in the course	0.18**	(0.000)

*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed)

Table 2 displays the correlations between grades and the independent variables. Significant positive correlations were found between grades and several variables, including GPA, hours worked per week, number of prior economics courses, SAT scores, initial expected grade, study hours per week, class attendance, instructors' use of graphs and equations, and course interest. Notably, an unexpected negative correlation was observed between grades and study hours per week. While seemingly counterintuitive, this finding aligns with results from previous research (Didia & Hasnat, 1998; Krohn & O'Connor, 2005).

Table 3. Ordered Logit Model Estimates

Variable	Coefficient	Std. Error	P[|Z|>z]
Constant	3.6443	0.2964	0.0000
GPA	0.0004	0.0004	0.2281
Gender 1=Female, 0=Male	0.3305	0.1473	0.0249
Age	0.0002	0.0004	0.6914
Course 1=Macro, 0= Micro	0.3797	0.1898	0.0454
University housing: 1= Yes, 0=No	0.0005	0.0007	0.5012
# of hours per week worked at a job	-0.0003	0.0001	0.0310
Number of mathematics courses taken	0.0005	0.0004	0.2022
Number of Economics courses taken	0.0005	0.0003	0.0770
SAT Score	0.0003	0.0001	0.0005
Expected Grade at the beginning of the semester	-0.0005	0.0009	0.5868
Expected Grade at the end of the semester	0.0008	0.0006	0.1695
# of hours per week spent on studying for the class	-0.0004	0.0004	0.3592
Number of missed classes	0.0019	0.0005	0.0003
Textbook rating	-0.0003	0.0011	0.7553
Understanding when the instructor uses graphs to explain a topic	0.0005	0.0014	0.7431
Understanding when the instructor uses equations to explain a topic	-0.0007	0.0011	0.5445
Interest in the course	-0.0026	0.0014	0.0670
Whether to recommend the course	0.0013	0.0005	0.0066
University	0.0924	0.3922	0.8137
If Instructor 1=1, 0=Otherwise	-0.5125	0.3390	0.1306
If Instructor 2=1, 0=Otherwise	-0.4077	0.6382	0.5229
If Instructor 3=1, 0=Otherwise	-0.6704	0.4881	0.1696
If Instructor 4=1, 0=Otherwise	0.0800	0.4697	0.8647
If Instructor 5=1, 0=Otherwise	-0.7418	0.5340	0.1648
If Instructor 6=1, 0=Otherwise	-0.8432	0.3224	0.0089
If Instructor 7=1, 0=Otherwise	-1.0306	0.6422	0.1085
If Instructor 8=1, 0=Otherwise	0.1801	0.5503	0.7434
Sophomore =1, 0=Otherwise	-0.0278	0.1673	0.8679
Junior =1, 0=Otherwise	0.4720	0.2212	0.0328
Senior=1, 0=Otherwise	0.3663	0.3570	0.3049
Reason for registration: Conflict w/ course	-0.1328	0.1789	0.4577
Reason for registration: Conflict w/ work	-0.6161	0.4120	0.1348
Reason for registration: Conflict w/ personal affairs	-0.5819	0.4413	0.1873
Reason for registration: reputation of instructor	0.0357	0.2289	0.8759
Mu(1)	1.8699	0.1075	0.0000

Variable	Coefficient	Std. Error	P[|Z|>z]
Mu(2)	3.6981	0.0809	0.0000
Mu(3)	5.3679	0.0976	0.0000
Dependent Variable: Grades			
Log likelihood function= -978.1016	Restricted log likelihood = -1030.485		
$\chi^2 =$ 104.7664	Degrees of freedom = 34		

Tables 3 and 4 detail the ordered logit estimates for equation (1), with Table 3 demonstrating a satisfactory model fit based on the χ^2 and log-likelihood diagnostics. To assess the model's explanatory power, a likelihood ratio test was employed, as ordered logit models do not produce F-tests. The resulting χ^2 statistic of 104.77 (34 degrees of freedom) confirms a good fit and joint significance of the independent variables. The cut-off points for grade categories (µs) were all statistically significant. Z-values are reported in Table 3 in lieu of t-statistics, as is common in ordered logit analysis. Seven variables emerged as statistically significant at the 95% level: gender, course type, hours worked, SAT score, missed classes, course recommendation, and instructor number six. Moreover, prior economics courses and course interest were significant at the 90% level.

Interpreting the coefficients from an ordered logit model is more complex than with ordinary least squares. Each coefficient represents the log of the odds ratio. To determine the actual odds ratio, we must take the exponential of the coefficient (eβ). For example, the gender coefficient is .3305, which translates to an odds ratio of 1.39. This means female students are 1.39 times more likely to achieve a higher grade compared to male students. Similarly, the odds ratios for being a junior, a macroeconomics student, a senior, and registering due to the instructor's reputation are 1.6, 1.5, 1.4, and 1.04, respectively.

Conclusions

Several factors, including hours worked, SAT score, the specific topics covered (microeconomics versus macroeconomics), and the number of missed classes, were found to have a substantial impact on student grades. By controlling for these variables, we investigated the effect of gender on performance in principles of economics courses and arrived at the following conclusions. The surveyed microeconomics and macroeconomics classes were primarily composed of male students. However, in contrast to numerous earlier studies that indicated male students excelled in economics, our results point to a different outcome. We observed a changing trend in the gender effect, with female students appearing to achieve greater success than male students in these courses.

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