Exploring Video Analytics as a Course Assessment Tool for Online Writing Instruction Stakeholders

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Exploring Video Analytics as a Course Assessment Tool for
Online Writing Instruction Stakeholders

Jason Michael Godfrey

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Arts

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ABSTRACT

Exploring Video Analytics as a Course Assessment Tool for Online Writing Instruction Stakeholders

Jason Michael Godfrey
Department of English, BYU
Master of Arts

Online Writing Instruction (OWI) programs, like online learning classes in general, are becoming more popular in post-secondary education. Yet few articles discuss how to tailor course assessment methods to an exclusively online environment. This thesis explores video analytics as a possible course assessment tool for online writing classrooms. Video analytics allow instructors, course designers, and writing program administrators to view how many students are engaging in video-based course materials. Additionally, video analytics can provide information about how active students are in their data-finding methods while they watch. By means of example, this thesis examines video analytics from one semester of a large western university’s online first-year writing sections (n=283). This study finds that video analytics afford stakeholders knowledge of patterns in how students interact with video-based course materials. Assuming the end goal of course assessment is to provide meaningful insight that will help improve student and teacher experience, video analytics can be a powerful, dynamic course assessment tool.

Keywords: online writing instruction, course assessment, video analytics, writing program assessment
ACKNOWLEDGEMENTS

I am grateful for Brian Jackson’s endless patience. As my thesis chair he always responded quickly, incisively, and fairly. He tempered this project into a coherent set of words despite my perpetual efforts to sabotage it. I would also like to thank my readers Dave Stock and Jon Balzotti. Their insights directed me, and the advice that they’ve given me will continue to help me grow as a scholar long after this project concludes.

Most importantly, I must thank Sarah, my wife. She is my exemplar.
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Exploring Video Analytics as a Course Assessment Tool for Online Writing Instruction

Stakeholders

Course assessment is an indispensable component of any first-year writing program. But standard forms of assessment are complicated as a writing course transitions to an online environment. One area where online writing instruction (OWI) has especially distinct affordances and constraints from its face-to-face (f2f) counterpart is assessment of instructional videos. Current research strongly advocates the continued practice of course assessment tailored specifically to an online environment (Hawisher and Selfe). Some researchers even demonstrate forms of course assessment in OWI (Comer and White). As of yet, however, no studies posit specific methods for assessing video instruction in the context of OWI. This study attempts to begin a conversation about how to assess video instruction in OWI by proposing video analytics as a powerful, flexible tool that can inform freshman composition stakeholders.

Re-examining course assessment practices in online versions of first-year writing (FYW) is more important than ever because enrollment is at record-breaking highs in both freshman composition and online instruction. According to the US Department of Education, a staggering eighty-five percent of students who don a cap and grab a diploma will take freshman composition. In fact, freshman composition leads the second most enrolled course, general psychology, by more than fifteen percent. Additionally, it is the only course in the top ten most in-demand courses to become more widely enrolled every decade since the seventies (Adelman 2006). A concurrent trend amongst American collegiate institutions is the ever-rising level of online education offerings. According to Elaine Allen and Jeff Seaman in “Changing Course: Ten Years of Tracking Online Education in the United States,” per capita online offerings in higher education increased by over twenty percent between 2002–2011. Additionally, the
number of students taking at least one online course more than doubled over the survey period (21). With online education expanding at a fast, steady pace and English composition holding steady as the most popular course, the need for research centered around improving OWI has never been more important.

In this study I propose that extracting and analyzing video analytics will reveal patterns in student engagement, behavior, and student-content interaction that positively contribute to course assessment. As video instruction allows students to order their lecture to-go, I argue that collecting analytics and integrating them into course assessment could be an important part of helping a freshman composition course “migrate” from an f2f environment to an OWI one (Teaching xvii). This article will introduce video analytics as a tool for course assessment by sharing insights from a study which collected video analytics from an OWI environment. Additionally, it will ask the following questions: How do methods of assessment via video analytics influence understanding of realized learning outcomes? And, what is the best role for video analytics to play in overall course assessment?

Literature Review

The steady, rapid shift towards OWI ought to be paired with critical examination of current assessment practices and, where appropriate, the integration of new assessment tools such as video analytics. As Scott Warnock notes in Teaching Writing Online: How and Why, it isn’t enough to merely drag and drop methods from one environment to another; the process should be thoughtful and weighted. Warnock uses the metaphor of “migration” to describe what it should feel like to move a class online from an f2f environment (Teaching xvii). It is an opportunity to scrutinize anew existing practices, as well as to incorporate practices that leverage
the distinct affordances an online environment offers. Additionally, *Applied Pedagogies* further
details interventions specifically for an OWI environment—offering specific support on topics of
accessibility, user interface, and more (Ruefman and Scheg). However, these works only begin
to examine the paradigm shift in course execution and assessment that is requisite as a course
changes modalities. Consequently, there have been calls for more research with strict
methodological constraints in distance education (DE) (Bernard 176; Zawacki-Richter et al. 44).
These same calls for more research and more varied research can also be found in both
composition research at large and OWI research (Litterio; Harris and Greer 49-50; Massey and
Gephardt 3).

But until theories and specific best practices about how to assess video instruction in
online writing environments are standardized, maybe it would be better to leave analytics to
researchers interested in big data and automated analysis. After all, OWI, like f2f freshman
composition, has a strong history of thorough, adaptive course assessment. Many prolific
scholars in composition pedagogy like Kathleen Blake Yancey, Brian Huot, and Edward White
defined principles that apply regardless of learning environment (White; Yancey;
“Interrogating”; Huot, Caswell; Huot, Perry; Huot et al.; Moore et al.; White). Perhaps building a
course assessment model based around tried and true principles can divert the need to invest time
and resources in gathering and interpreting video analytics. Perhaps not. As Hawisher and Selfe
stated, course assessment “is too important and its implications too far-reaching to be left to
assessors and other specialists in measurement” (135). This suggests that formal training in data
science is not requisite to being an informed stakeholder. More, it suggests that we as
stakeholders have an imperative to our students to understand their experience.

Beyond the recognized necessity to adopt course assessment needs in composition at
large, OWI scholars have begun to discuss particular methods of course assessment that leverage
the affordances of an online environment. In fact, such development is a stated priority. The CCCC’s position statement asserts that “appropriate composition teaching/learning strategies should be developed for the unique features of the online instructional environment” (Yancey et al.). As a course moves online, course assessment should adopt tools suited to its new environment. For example, in the article “Adventuring into the MOOC writing assessment,” Denise Comer and Edward White discuss their efforts “designing and implementing... course assessment measures” for their new writing environment (321). Their MOOC-centric suggestions could almost undoubtedly be transferred with some level of success to a non-MOOC online classroom. And the notion that new assessment strategies are crucial to a new environment has been tested. In the article “Case Studies to Enhance Online Student Evaluation,” researchers in educational assessment concluded that “easy access to timely data is essential for institutional responsiveness” (7). The more stakeholders who have access to relevant data, the better. Even though many texts outline foundational principles of course assessment, it is important to integrate new tools for a new environment.

Video analytics are a particularly promising tool for OWI course assessment because they have already proven useful in other fields. For example, in a 2017 article “Reengineering an Engineering Course” researchers used video analytics from course content to “understand how students were accessing and using” course resources (Peter et al. 6). The video analytics in this study revealed student viewing patterns. Analytics, when used in conjunction with other assessment measures, allowed the researchers to conclude that video lectures “were helpful for learning” (16). Additionally, Michail Giannakos extensively advocates for the use of video analytics as a tool for understanding video-based learning. His work, nearly always with collaborators, reviews literature, examines the utility of analytics, and even offers an open-source tool for collecting certain analytics (Giannakos; “Reviewing”; “Exploring the Relationship”;
Chorianopoulos and Giannakos; “Collecting”). Because video analytics have demonstrated their utility as a course assessment tool in other fields, I believe that they could also be used in OWI course assessment.

Methods

To conduct this study, I collected video analytics from 15 online sections of first-year writing (n=281) at a large, Western university during 2018s spring semester. Enrolled students had exclusive access to view videos embedded into their learning management software (LMS). As students progressed through the course, they were prompted to watch videos; however, none of the videos were compulsory for course progression. Although students were assigned to watch 12 out of the 13 videos, there was no point incentive directly or indirectly tied to watching videos. One of the videos was explicitly labelled as "optional." All research was conducted with IRB-approved protocols.

The videos ranged from 4:28-12:33 minutes in length. They contained a script read by the writing program administrator. Some parts of the video were read in a quasi-lecture format, with the professor speaking to his webcam. Videos were often supplemented with relevant visual aids and original cartoons.

The possibility of collecting all of the analytics for fifteen sections of a course, totaling many possible data sets with at least 281 entries each, reaps many possible ways to explore how students interact with course content, when and why writers perform assigned tasks, and what interaction patterns lead to successful writing. There is simply too much accounting to be usefully encapsulated in one article. As such, the purpose of this study is to serve as an introduction to the utility video analytics can serve course assessment in OWI; it is not to provide
a comprehensive list of analytics that can be collected and thoroughly document their possible utility. To that end, this study will only examine three analytics:

- Views
- Clickstream interactions
- Audience engagement

Study Limitations

Video analytics offer valuable insight into how students interact with course content that can’t be collected in any other way. But they come with limitations. For example, all video analytics used are based on number of views. Number of views does not equate to number of distinct viewers. Because of data collection limitations, there is no way to know how many distinct viewing devices each video had, and, even if it were possible, there is no way to economically sort distinct viewing devices from distinct viewers. Therefore, I incorporate all views as part of the results. While videos were only available through the university’s LMS, some views may have come from online administrators, writing program administrators (WPAs), or course instructors, skewing the data. Additionally, some students may have viewed certain videos twice. This may also inflate views.

I also want to explicitly outline the limitations that analytics bring to course assessment. Analytics, video or otherwise, offer data points as a reference without much story as to why the data exists in that fashion. As such, analytics should be seen only as the beginning of a conversation in a full course assessment. Even the most thorough data, which turns an array of data points into a constellation from which patterns are identifiable, can mean little without exploration as to the cause of these patterns. Analytics only show what is happening. Evidence
outlining why must come from other assessment tools that corroborate similar trends and suggest solutions that are tailored to the individual course being examined or the individual section being taught.

Results

Views Per Video

The total number of views was collected for each of the thirteen course videos. The table below shows how many views each video received and what percentage of viewership that number represents when compared to the total number of matriculated students.
FIGURE 1. The number of views per video and the percentage of viewership when compared to the total number of matriculated students

<table>
<thead>
<tr>
<th>Video title</th>
<th>Views</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro to Course</td>
<td>250</td>
<td>88.97%</td>
</tr>
<tr>
<td>Rhetorical Situations</td>
<td>182</td>
<td>64.77%</td>
</tr>
<tr>
<td>Writing Plans</td>
<td>204</td>
<td>72.60%</td>
</tr>
<tr>
<td>Power of Style</td>
<td>129</td>
<td>45.91%</td>
</tr>
<tr>
<td>Revision</td>
<td>108</td>
<td>38.43%</td>
</tr>
<tr>
<td>New Tasks</td>
<td>211</td>
<td>75.09%</td>
</tr>
<tr>
<td>Rhetorical Critic</td>
<td>150</td>
<td>53.38%</td>
</tr>
<tr>
<td>Crank at Work (Optional Video)</td>
<td>49</td>
<td>17.44%</td>
</tr>
<tr>
<td>Shape of Analysis</td>
<td>315</td>
<td>112.10%</td>
</tr>
<tr>
<td>Join a Conversation</td>
<td>149</td>
<td>53.02%</td>
</tr>
<tr>
<td>Finding a Topic</td>
<td>141</td>
<td>50.18%</td>
</tr>
<tr>
<td>Creating a Research Space</td>
<td>197</td>
<td>70.11%</td>
</tr>
<tr>
<td>Citing</td>
<td>115</td>
<td>40.93%</td>
</tr>
</tbody>
</table>

The videos from our program had an average viewership that fell at 60.23%. This is slightly above the average view rate from other studies. For example, in the study of a Chemistry course at UC Berkeley, "Costs, Culture, and Complexity", researchers discovered that each lecture for a particular class was viewed approximately 0.355 times per enrolled student (29). A later article reported viewing rates in “University Foundation Courses” at around 43% (Ozlan and Ozarslan 37).

The videos from our program have high variation in total number of views. While the most watched video has more views than enrolled students, the least-watched video was viewed...
by only seventeen percent of students. To further understand why there is lower viewership and such great variation of viewership, it may help to reorganize this data. While the table above reveals trends about student viewership, it doesn’t give very many clues as to why a certain video might have a greater or smaller number of views than another video.

The graph below may help uncover a couple of possible reasons why views per video vary so drastically. Since the below graph is unconventional, I’m going to explain it textually before presenting it visually. Along the horizontal axis is a timeline. The horizontal axis has a point for every day in the semester. The front of the graph represents the first day of the semester. Along this timeline are bars that represent each video on its peak viewing day. That means that this graph shows not only the total number of views per video but also contextualizes what date those videos were viewed throughout the semester and visually represents how the average student spaced out the dates between their viewing experiences. I believe this unconventional representation to be a potent distillation and contextualization of viewing analytics because it makes student viewing and video placement patterns apparent, whereas, they may have been more difficult to extract from more conventional representations of viewer analytics (minutes viewed, engagement scores, etcetera).
FIGURE 2. The total number of video views, located on the day where the video received its largest amount of views

This visual representation of student viewing patterns reveals several phenomena that the first figure was unable to account for. First, the views are not evenly distributed across the semester. In the week between 2/4/2018 and 2/11/2018 three videos had their peak viewing days. However, in the month between 2/19/2018 and 3/19/2018 there was a four-week stretch where no video had its peak viewing day. Second, when two videos were placed in the course in quick succession, views dropped—sometimes dramatically (with one exception). Where there is a pattern of two videos close together, views dropped between eight and eighty-two from the first video to the second video. Third, a considerable drop-off in viewership can be observed the one instance where a third video is viewed in close succession to two other videos. Just after the “2/3/2018” marker are three videos that are spaced relatively close together. The drop-off between videos one and two is sixty-one views; however, the drop-off between videos two and three is 101 views—resulting in the least-viewed video of the course.
Clickstream Interactions

Clickstream data is, in essence, seeing the route a user has tread through digital space. While taking a look at views helps inform how many students attended “class,” clickstream interactions reveal who left class in the middle (only to show up again at the end), and who simply left early. In a face-to-face classroom, a teacher might take a broad approach to collecting the same analytic by taking attendance. Just like a teacher might not want their students to serially leave lectures early en masse, they may not want their students clicking out of the videos early. Unlike in a classroom, however, students are not obliged to sit through a whole video. No matter how laissez faire a classroom is, students have more freedom online. Because of that, tracking how students move through a digital space can be an incredibly valuable analytic on a course and component level.

In analytics lingo, clickstream data typically refers to user navigation from page to page. However, it can be used to refer to user navigation within a single video. This particular subset of clickstream interactions has different names and different functions. I’ve chosen to follow Google’s lead and call this particular subset of clickstream interactions “audience retention” (Audience). Because of limitations caused by the university’s analytic-collecting platform, the only clickstream interactions available showed the number of viewers a video had at 25% intervals throughout the video. The table below shows how many views a single video had across those intervals.
FIGURE 3. Audience retention throughout video (retention at the start of video, a quarter of the way through, halfway through, etc…)

<table>
<thead>
<tr>
<th>Video Title</th>
<th>Views at 1%</th>
<th>Views at 25%</th>
<th>Views at 50%</th>
<th>Views at 75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro to Course</td>
<td>226</td>
<td>188</td>
<td>165</td>
<td>166</td>
</tr>
<tr>
<td>Rhetorical Situations</td>
<td>176</td>
<td>142</td>
<td>134</td>
<td>130</td>
</tr>
<tr>
<td>Writing Plans</td>
<td>198</td>
<td>168</td>
<td>152</td>
<td>159</td>
</tr>
<tr>
<td>Power of Style</td>
<td>124</td>
<td>116</td>
<td>115</td>
<td>110</td>
</tr>
<tr>
<td>Revision</td>
<td>108</td>
<td>99</td>
<td>97</td>
<td>82</td>
</tr>
<tr>
<td>New Tasks</td>
<td>211</td>
<td>183</td>
<td>193</td>
<td>182</td>
</tr>
<tr>
<td>Rhetorical Critic</td>
<td>137</td>
<td>119</td>
<td>114</td>
<td>115</td>
</tr>
<tr>
<td>Crank at Work</td>
<td>46</td>
<td>41</td>
<td>35</td>
<td>31</td>
</tr>
<tr>
<td>Shape of Analysis</td>
<td>302</td>
<td>245</td>
<td>221</td>
<td>194</td>
</tr>
<tr>
<td>Join a Conversation</td>
<td>148</td>
<td>125</td>
<td>125</td>
<td>117</td>
</tr>
<tr>
<td>Finding a Topic</td>
<td>125</td>
<td>103</td>
<td>96</td>
<td>85</td>
</tr>
<tr>
<td>Create a Research Space</td>
<td>183</td>
<td>147</td>
<td>165</td>
<td>144</td>
</tr>
<tr>
<td>Citing</td>
<td>111</td>
<td>101</td>
<td>102</td>
<td>92</td>
</tr>
</tbody>
</table>

First, this table shows that all videos retained just over 64% of their audience until three-quarters of their runtime. Second, this table reveals that occasionally viewers skip around the video rather than watching linearly. This is demonstrated because six of the thirteen videos do not have progressively fewer views. This indicates that students do jump around the videos. Third, overall viewership generally declines as the video progresses. This trend is also mirrored in other large-scale studies (Juho et al.; Kovacs; Dissanayanke et al.). The figure below visualizes this pattern by averaging the audience retention for all videos collected and then placing them on a line graph.
FIGURE 4. The average view decline throughout playback

This data visualizes the way viewership overall declines in the average video. There is a slightly larger average fall-off between 1% and 25% than between 25% and 50% or 50% and 75%. However, viewership remains relatively steady throughout the video. In fact, the average video retains 76.7% of its viewers until the seventy-five percent of the way through the video.

Video Engagement Score

Engagement seems to be quantified differently to every site that measures it. For the purpose of this study, the engagement score is calculated by converting a video into one-hundred equal parts. The next step is to track how many views each one of those one-hundred parts gets (Engagement Report Reference). Then, finally, the engagement score is calculated by dividing what percentage of the video each user viewed by the total number of views the video received. This means that if a video is viewed all the way through every time someone clicks on it, it will
have an engagement score of one-hundred. If only half of the video is viewed every time, then it will have an engagement score of fifty.

FIGURE 5. A videos engagement score and video length.

<table>
<thead>
<tr>
<th>Video title</th>
<th>Engagement Score</th>
<th>Video Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro to Course</td>
<td>69</td>
<td>12:30</td>
</tr>
<tr>
<td>Rhetorical Situations</td>
<td>73</td>
<td>6:34</td>
</tr>
<tr>
<td>Writing Plans</td>
<td>76</td>
<td>5:40</td>
</tr>
<tr>
<td>Power of Style</td>
<td>83</td>
<td>4:32</td>
</tr>
<tr>
<td>Revision</td>
<td>85</td>
<td>4:27</td>
</tr>
<tr>
<td>New Tasks</td>
<td>84</td>
<td>3:31</td>
</tr>
<tr>
<td>Rhetorical Critic</td>
<td>77</td>
<td>9:52</td>
</tr>
<tr>
<td>Crank at Work</td>
<td>68</td>
<td>4:32</td>
</tr>
<tr>
<td>Shape of Analysis</td>
<td>69</td>
<td>4:11</td>
</tr>
<tr>
<td>Join a Conversation</td>
<td>79</td>
<td>5:36</td>
</tr>
<tr>
<td>Finding a Topic</td>
<td>65</td>
<td>10:13</td>
</tr>
<tr>
<td>Creating a Research Space</td>
<td>72</td>
<td>5:28</td>
</tr>
<tr>
<td>Citing</td>
<td>81</td>
<td>5:26</td>
</tr>
</tbody>
</table>

The information in this table demonstrates that the average students, if they started a video, watched 75.46% of it. Variation in engagement score ranges from 65% to 85%. This is lower than variation in total views, which varied from 38% of the student population to 112%. The lower variation and generally higher engagement scores demonstrate that students generally watched the majority of the videos that they clicked on.

In order to assess possible avenues for engagement score in course assessment, I calculated the correlation coefficient for engagement score with number of views and video
length. Video engagement and views had only a weak negative correlation (-0.24). Video engagement and video length had a moderate negative correlation (-0.468) and can be viewed below.

**FIGURE 6.** The correlation between video engagement and video length

Discussion

This study yielded three kinds of results from video analytic data:

- The total number of views that each of the thirteen videos embedded into the course received throughout Winter 2018 semester.
- A version of clickstream interactions that only collected four data points total per video. It collected how many views a video had at 1%, 25%, 50%, and 75%.
- A version of audience engagement that essentially reports the average total percentage of the video viewed by the average viewer.
This section will address the role video analytics could play in course assessment and how to use data from video analytics to inform other methods of course assessment in OWI.

**Video Views**

A temptation when using viewership as a primary analytic in course evaluation may be to allow the pure number of views to dictate the effectiveness of a video. And that makes sense to a degree. After all, if students aren’t viewing a video, then how can they incorporate the skills taught into their coursework? Let’s take the video “Revision” as an example. That video only got 108 views. That means that if each viewer was a unique student, and if each student was able to perfectly apply the principles taught in that video to their writing, then the video still only reached 38% of its intended audience. It might be easy to adopt a dismal outlook on the effectiveness of that video.

If boosting quantity of views is a goal for course assessment, researchers have discovered ways to improve the number of viewers. It is as simple as embedding quizzes that will count towards the final grade (Watcher et al. 10). Another recent DE study corroborated that finding, discovering that students most frequently watched the parts of the video with the answers to the quiz—more than one time per student (“Making Sense” 272). Additionally, videos with fewer views per student correlated with lower overall scores on student quizzes (“Making Sense” 276). If the technology doesn’t allow for embedded quizzes, then cherry-picking factoids specifically from the videos to be used in other quizzes is another way to boost student viewership. Both of these methods are bona fide, sure-fire ways to get more students to watch each video, and for those students who watch the videos to pay more attention while they are watching.

But that might not be optimal for this course. To demonstrate, let’s revisit the “Revision” video as an example. “Revision” isn’t reaching its target audience. Despite being an assigned video, only 38% of students viewed it. The tried-and-true solutions are outlined in the literature.
Add quizzes based explicitly off of the video instruction. Make viewing mandatory. Attach points to factoids presented in the video. But those solutions might be more harmful than helpful in the context of this course. Here is why: if the course as it stands were to incorporate user-response questions during each video without incentivizing more evenly distributed viewing patterns, then there is a high risk of overworking students in the more video-filled sections of the course. Perhaps, if the number of views per video is a concern for course administrators, simply guiding students to videos at a more even pacing would increase viewership without overloading students. Then, if viewership doesn’t increase despite best efforts to help students view the videos at less sporadic intervals, perhaps more extreme methods could be considered. But sometimes viewership shouldn’t be considered a top-priority concern.

To know whether or not a video is being effective in an online writing course, it’s necessary to examine the pedagogical function of the video within the course structure. For example, consider the following questions: Are the videos conveying procedural information that students are unable to get somewhere else in the course? Were the videos intended to play a central role in student education? Should they play a central role? If the videos are only meant to be supplemental to the course textbooks and online readings (it is a writing course, after all) then maybe further incentive to push students towards video watching would actually be a distraction and therefore a hindrance to student learning outcomes. Different students learn differently, and having information available in multiple modalities allows students to optimize their own learning experience. In this particular writing course, the videos are assigned but ultimately non-compulsory for class credit, and, if similar information is present in both text and video, then why force students to view the videos? Additionally, the video with the lowest number of views, “Crank at Work” was explicitly outed as being completely optional, not even assigned. In that light, 17% viewership is not a concern; rather, an informal indicator of what percentage of
students are willing to work extra to excel. That isn’t to say that optimization of video presentation shouldn’t be done. But because the videos fill a supplementary pedagogical purpose rather than the main method of communicating crucial course materials, perhaps adding in-video quizzes isn’t an appropriate first step. More, because of extant student viewing patterns, adding in-video quizzes or the like without somehow pacing students through the videos at a more even rate would undoubtedly overwork students during especially high viewing periods. Although it probably isn’t true in every case, in this case at least more views doesn’t necessarily equate to greater video success. Understanding the pedagogical function(s) that videos serve in this course is a necessary precursor to formulating plans for course optimization.

In this particular case, contextually examining number of views present as a complex variable in overall course assessment helped take what could’ve seemed like a very simple analysis and turned it into a much more fruitful discussion. Sometimes it only takes one extra step. In this case, it meant placing the viewership analytics within the context of a timeline. Once that was done, it was easy to see that embedded quizzes and other point incentives would have overburdened students with a large amount of assignments in a short period of time. Consequently, examining analytics peripherally would have been worse than not looking at them at all. Additionally, examining the purpose that videos play within the course structure helped move a series of numbers into a robust conversation. But slowing down enough to have a conversation with the data, helping it explain itself, can reveal actionable improvement items that otherwise would have remained a secret.

I’m certain that further investigation on views could yield even more direction for improvement. For instance, breaking down views according to days of the week or time of the day might be interesting avenues to discover trends in student viewing patterns that could inform revision of the course even more.
Clickstream Interactions

Clickstream interactions have potential to be some of the most powerful analytics in course assessment. The ability to dissect a video into fine, granular portions and see the peaks and valleys in student viewing patterns can inform stakeholders which specific elements within a video demand and retain student attention. This is especially true because peaks in viewership are often only a fraction of a minute long (Juho et al.). Access to such granular data shouldn’t be too much to ask in most cases. For context, in “Making Sense of Video Analytics” Giannakos was able to view student clickstream interactions with incredible precision, down to a one second window (“Making Sense”). YouTube, which offers free analytics for its videos, allows users to view audience retention within a similarly small window. Such precision with clickstream interactions allow for a more informed conversation about how to improve video integration.

Unfortunately, the clickstream interactions that I had access to only gave me the amount of views at quarter intervals. But even though collection in this study resulted in few leads that might improve the course, I chose to integrate them into this study for three reasons:

First, to introduce clickstream interactions as a potential component of course assessment. There exists a near infinite number of ways to collect and remix video analytic data. Clickstream interactions are consistently among the most used analytics. Both Google Analytics and YouTube (the most popular analytics collecting platform and video hosting platform respectively) prominently feature forms of clickstream interactions. They’re so important and so popular that a team of researchers in DE created a free tool to help stakeholders collect such data (“Making Sense”).

Second, to argue that within an educational institution it is necessary to have the technology to properly measure trends that may reveal what changes need to be made. I agree with Zawacki-Richters assertions that research should focus on “innovation and change” in
distance education (15). However, without access to proper assessment techniques knowing how to manage or what to change in a program becomes a futile effort. For example, in this case there simply isn’t enough data to draw meaningful conclusions. As such, creating actionable items to possibly impact these trends based on the data collection alone would violate OWI instructional principle 3 as outlined by the CCCC. Principle 3 states, “Appropriate composition teaching/learning strategies should be developed for the unique features of the online instructional environment” (Yancey et al.). Based on this data, there is little direction on what an “appropriate” strategy to develop could be. Four snippets of clickstream interactions leaves a lot of room for variability in the dark zones.

Third, to demonstrate that even sub-par analytics can lead to intriguing questions that guide further course assessment. Empirically, students who watched the course videos did not watch the entire video. But they did watch most of the video. This could be an important area to follow-up with students on. Do students feel like they got the information they needed out of the course videos? What viewing techniques do students recall using? Did they primarily watch a video front to back, skipping through only once or twice? Or did they skip around videos much more, watching certain portions of a video multiple times in a single viewing? Did they ever pause videos? Why? Any of these follow-up questions could be important for continued assessment and internal review. Clickstream interactions, like any analytics, are not the end-all, be-all of course assessment; more comprehensive analytics may lead to better questions. But even video analytics that aren’t versatile or granular can lead to questions and guide course assessment.

**Audience Engagement**

In this case, audience engagement is more granular than clickstream interactions. It confirms with much more precision that once students sit down to watch a video, they watch the
majority of it (~75%). Knowing that the created product is fairly well-viewed is very reassuring.

It would be far less work to rearrange or restructure a course so that video viewership is more emphasized than it would be to create the videos anew. Although the metric “engagement score” is itself more difficult to understand than “views” or “clickstream interactions,” extracting, understanding, and integrating the data proved useful in course assessment by revealing how much the average student views of each video.

However, knowing that video length is moderately negatively correlated with higher engagement scores may be an important consideration. Checking to see if there is a causal link between video length and engagement may help when reshoots eventually take place. For the time being, we were able to discuss video length during the end-of-term focus groups to get better feedback. While it would be nice to know if this correlation is echoed in national trends, because engagement is calculated differently by different sites, searching for equivalent trends becomes nearly impossible. Unlike with the other two analytics, there is not any valuable large-sample, experimental, robust DE research to compare it to. Nevertheless, the inclusion of the analytic in course assessment could help inform future iterations of the course in a positive way.

But again, the inability to easily manipulate the data imposes constraints on the actionable outcomes that can result from this data alone. For example, how many students simply clicked into a video, realized they weren’t where they wanted to be and clicked out quickly, leaving an engagement score of nearly zero? I’m sure it happened. Imagine this: A student in the library clicks on a video—for a second the laptop fills the once quiet void with a freshman composition lecture. Then, just as quickly as it started, the student closes the window. Or maybe a student simply clicks on the wrong link and then clicks out once the mistake is noticed. Or maybe any one of many other options. No matter the circumstance, quickly opening and then exiting a video would result in an outlier engagement score, which would negatively skew the
results. It doesn’t take very many zeros to bring down even a relatively high score. Being able to manipulate the data to omit outlier engagement scores would help create a more accurate idea about what percentage of the video students are watching. Additionally, if the number of tragically low engagement scores is high, then asking why so many students are clicking links they aren’t actually interested in viewing would be another valuable area of inquiry. Being able to see and exclude certain engagement scores might help reveal with more precision how to interpret the data that is present.

**Implications for Online Writing Instruction**

Using video analytics as a course assessment tool influences understanding of realized learning outcomes by informing stakeholders roughly how many students engaged with video-based course material. Although engaging with course material is a far cry from assessing realized learning outcomes, I argue that it is a necessary first step. Of the assigned videos within this study, three of the twelve were viewed by fewer than half of the enrolled students. Knowing that those videos were poorly viewed is a necessary prerequisite to discovering why those videos were poorly viewed. Although course assessment without access to video analytics may be able to probe how students felt about videos in general, introducing video analytics influences understanding of realized learning outcomes by allowing stakeholders to probe students about specific interaction patterns.

Video analytics aren’t the end of course assessment. Rather, video analytics inform more student-focused modes of assessment. The goal of a freshman composition course isn’t to make sure that students watch every video. In fact, as was the case with “Crank at Work,” sometimes high viewership isn’t even a priority. Obtaining meaningful insight that will help improve student and teacher experience is the goal. In this study, the video analytics helped generate and
revise survey and focus group questions that benefitted internal review. In this way, the video analytics informed the methods for qualitative data collection—it didn’t replace them.

This study only covered how course analytics could be used to inform course assessment at an administrative level. However, it may be purposeful to study whether it is feasible to make analytics available to individual course instructors. Just like instructors often receive end-of-term feedback as a part of assessment, instructors could also surely benefit by viewing how much and when students interact with course content. While analyzing video analytics with course-level granularity was not feasible for this project, allowing instructors to view their own course’s analytics would allow instructors to make small, course-specific adjustments. Rather than handing course changes solely from the top-down, permitting instructors to view analytics personally allows them to act autonomously. Consequently, I believe that studying how video analytics can help empower individual instructors could be an important area of future inquiry.

Additionally, the study design of this research could be expanded to make it generalizable to OWI programs across the nation. Currently, there is no data about average student viewership, retention, or engagement that a new OWI course could use as a baseline to evaluate their own videos. Creating a greater body of scholarship dedicated to understanding the currently unquantified and largely undiscovered viewing patterns of students in our digital classrooms will help course assessment migrate from f2f classrooms.

Since the research on video analytics as a tool for course assessment in OWI is so limited, possibilities for future research abound. Other articles could define different video analytics and theorize possible uses for OWI generally. Further assessment about student perception of video instruction could be conducted. Experiments determining how student views, engagement, and perceptions change based on specific video treatments could be conducted. Future work could evaluate whether or not skills taught in video instruction are evident in
student writing. Honestly, considering video analytics are the defining mechanism in how popular video hosting platforms decide what content is valuable (Earn Revenue; How to earn; Twitch), I’m surprised that there isn’t a greater surge in OWI or DE in general to investigate their possible utility in an educational context.

Conclusion

If you are reading this study, then you are probably either responsible for teaching or directing the teaching of the most in-demand course in the country. Freshman composition is hands-down the most common course for American undergraduates and has been for at least the past forty years. It’s a rite of passage. As the course becomes increasingly more in-demand in an online format, using new course assessment skills should be an integral part of adaptation. If video instruction is a part of the course, then using video analytics will help you maximize the affordances of your digital space.

But in order for analytics to positively impact your section, course, or program, the data “must be fused deliberately with a more individualized, learner-driven, and learner autonomous approach towards assessment” (Comer and White 348). Because it is a necessity to create an individualized, learner-driven environment, the analytics that I collected and included in this study probably will not be the analytics that will be relevant to another program. After looking at all of the video analytics collected, I included only those that I believe revealed patterns of student behavior that merit further investigation. None of the analytics collected revealed patterns that demanded immediate and drastic course revision or overhaul, but they did positively inform the stakeholders and shaped further course assessment that was conducted for internal review. For example, the analytics collected helped inform a survey that was distributed to
students as well as helped generate questions for an end-of-semester focus group. Ultimately, changes to the course (if any) were informed by explicitly expressed student and instructor opinion, and the analytics collected helped diagnose which areas of the course deserved more attention than others.

Circumstances will undoubtedly vary for other writing programs. Because of different analytic-collecting software, it is possible that “video engagement” will be a completely separate analytic with the same name. Additionally, it is very possible that the clickstream interactions collected will contain much more granular information than the clickstream interactions in this study. Much more important than specific analytics that could be collected or specific interventions based off of patterns observed from those analytics, is a commitment to being an informed stakeholder. Collecting analytics is only a part of the formula for creating a robust, reactive course assessment, but I argue that it should be a part.

Comer and White assert that “for all the allure of…analytics, what research and assessment communities should really be looking at are individual students” (348). Course assessment should empower all stakeholders, from student to WPA. I argue that knowing how a student navigates a digital writing environment is a crucial first step to building an empowering assessment community. I attempted to illustrate that point by examining and interpreting three analytics. And you may have disagreed with my interpretations of those analytics. That’s perfect! The purpose of collection and analysis isn’t to know how to effect change; it is to concretely understand what students are doing in their online environment, and each analytic offers new perspectives on possible areas for improvement.


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