

## Teaching with Infographics: Practicing New Digital Competencies and Visual Literacies

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### Abstract

This position paper examines the use of infographics as a teaching assignment in the online college classroom. It argues for the benefits of adopting this type of creative assignment for teaching and learning, and considers the pedagogic and technical challenges that may arise in doing so. Data and insights are drawn from two case studies, both from the communications field, one online class and a blended one, taught at two different institutions. The paper demonstrates how incorporating a research-based graphic design assignment into coursework challenges and encourages students' visual digital literacies. The paper includes practical insights and identifies best practices emerging from the authors' classroom experience with the infographic assignment, and from student feedback. The paper suggests that this kind of creative assignment requires students to practice exactly those digital competencies required to participate in an increasingly visual digital culture.

**Keywords:** online learning, communications, graphic design, Internet research, peer-to-peer collaboration, teaching

### Introduction

Advances in information and communication technologies have raised new digital literacy challenges, including a pressing need for visual communication skills (Osterman 2013). In what some have called the rise of the visual culture of the web, images, photos and videos are becoming a form of social currency to be shared and curated (Verma 2013; Walter 2012; Rainie 2012; Kern 2013). Today, for users to successfully navigate the web they must have the digital visual literacy skills to comprehend and evaluate both graphical information and multimedia messages (Lambert 2008). Even those students who are part of the Facebook generation, growing up participating in a highly visual online culture do not necessarily have the skills to engage critically and effectively with images and media in an academic environment (Hattwig 2013).

Visual literacy is generally understood as a process that includes finding images, analyzing them, evaluating them, applying them to a purpose, and producing them (Conner 2012). Incorporating an infographic assignment in the post-secondary classroom (online or on campus) is one way to respond to educators' need to develop assessment tools and design curriculum that reflects the information and media literacy demands of contemporary digital culture and commerce (Osterman 2013). An infographic, otherwise known as a data visualization, is created using graphic design software, and uses pie charts, icons, decorative fonts, diagrams (and the like) to

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illustrate information and statistics – creating a visual narrative. Similar to a traditional research essay, an infographic assignment challenges students to visually communicate a thesis, supported by citations and statistics sourced from the scholarly literature and the popular press. Rather than present this position in a text-based format, students must design an information visualization to illustrate their argument, using tools such as those from Adobe Creative Cloud (Photoshop, InDesign, Illustrator), or using online design tools to semi-automate the process (such as Piktochart, Infogr.am, or Pixlr).

Through examining two classroom examples, this paper attempts to demonstrate the pedagogical benefits of integrating infographic assignments into an online or blended course, and to detail some of the technical and instructional challenges involved. The comparison of two mass communications university courses at different institutions, one larger online course and one medium sized blended one, demonstrates two different approaches to the infographic assignment and describes its effectiveness in supporting visual digital literacy skills development, from instructors' and students' perspectives.

### **Technology in the Post-secondary Classroom:**

Over the last few years, and particularly since the explosive growth of MOOCs [massive open online courses] in late 2011, e-learning and the use of social media as a pedagogical tool has been the subject of great interest among both academics and pedagogues (McLoughlin and Lee, 2010; Downes, 2010; Aggarwal, 2011; McDermott and Kowalsky, 2011; Potter and Banaji, 2012; Dabbagh and Kitsantas, 2012). In fact, the use of different digital technologies, including social media, in the classroom has resulted in several benefits, including an increase of learner diversity (Li and Snow, 2012), the creation of learner communities (Lewis, Pea and Rosen, 2010; Downes, 2010), and extending knowledge production and dissemination beyond the walls of the ivory tower (Mott, 2010; Goodwin-Jones, 2012). This may be the reason why the use of digital tools in both traditional and online learning has remained a popular approach over the last few years. Many educators have reported success in integrating such tools as blogs, wikis, and social networks into their instructional and assignment design (Ferdig and Trammell, 2004; Kaldoudi et. al., 2011; Wolf, Beckem, and Matias, 2011; Baird and Fischer 2010; McLoughlin, 2011).

Despite all the existing research on new technology use in the higher education classroom, the literature on using infographics in teaching remains highly limited, at best. While similar literature exists on the use of digital video (Kay, 2012), and while work has been completed in an effort to understand how readers process the information contained within infographics (Pasternak and Utt, 1989), reports on best practices in teaching that make use of infographics either as a information-sharing tool, or as a method of evaluating students' work are difficult to find. This absence is conspicuous since infographics seem a natural way to reach students with diverse learning styles, particularly visual learners (Smicklas, 2012; Lankow et. all. 2012).

## **Visual Pedagogy**

The use of infographics is an important step towards developing a pedagogical approach that draws on visuals. This kind of approach is valuable for multiple reasons. Firstly, it speaks to what we might call different ‘learning styles’ – though admittedly this is a contested notion – or communication modalities. For example, studies have shown that some learners experience greater self-efficacy and even achieve higher course performance when faculty provide resources that cater to various ways of knowing, communicating information, and remembering it (Hawk and Shaw, 2007). Students who prefer information visualizations, the research shows, retain material most effectively when they are able to see it, that is, when material is presented with illustrations and photos, slides, or other graphic forms. This means that pictures can help the visual learner to process material, but so can flow charts, diagrams, and of course infographics (Felder and Solomon, 2000). Secondly, more than just a pedagogical strategy for reaching visual learners, using images in the classroom can be an important tool to encourage a general visual literacy among all the students (Thomas, Place and Hillyard, 2008). Engaging learners in image creation thus helps them understand visual culture, or the ‘visual construction of the social’ which forms part of their often unseen day-to-day experience of the world around them (Mitchell, 2002). Finally, like the creation of arguments in a rhetoric or professional writing course, the creation of pictorial representations of written arguments requires that students engage in important critical analysis of the material that they are learning. Hence, the activity of designing a diagram or a visual representation of an idea can actually help students to engage with an argument, sharpening their rhetorical skills (Danis, 1993).

### **Teaching Case 1**

As part of the assignments in a second-year ‘Digital Media Theory and Trends’ (FILM260) summer course at Queen’s University in Canada, 500 students were tasked with creating infographics to illustrate a key trend in digital media culture. Students spent most of a week researching and designing their infographics, and completed a short 300-word writing assignment detailing their feedback about the process of constructing and consuming/reading infographics by other students. As this was an online class, students posted their work in the learning management system and offered each other constructive feedback and commentary on both the infographic form and content. Average grade achieved in the class on this assignment was 75% (B+) and assessment was according to a rubric (Appendix 1) that described how form and content were weighed, as well as the expectations for peer critique. The infographics represented fifteen percent of students’ final grade, not unlike the weighting of a short research paper.

### **Teaching Case 2**

As a weekly tutorial activity in a cross-faculty ‘Digital Literacy’ (EID100) elective at Ryerson University in Canada, approximately 120 students in two sections (one in Winter term and one in Spring term) were asked to create specific infographics to illustrate a concept relevant to the week’s course material about web analytics. Students were told to choose a post from the blog of analytics ‘guru’ Avinash Kaushik and illustrate their post using an infographic they would create using piktochart.

Students then posted their infographic to the public weblogs that they maintained for the course, along with a very brief 150-250 word reflection on the process of creating the infographic, or on the information they learned while creating it. The average grade achieved on this activity was 80% (A-), and the assignments were assessed according to a rubric (Appendix 2) that outlined expectations for both the infographic and the blog post. Since this assignment represented one of 10 possible tutorial activities that students could participate in, it was only worth a very small portion of their overall mark (2.5%), and it was intended more as an application of concepts (like a lab), rather than a large assessment of the students' performance in the course.

From these two teaching snapshots, the following insights emerge concerning the infographic design assignment and student engagement online, fostering digital and visual literacies, and supporting self-reflection and self-directed social exchange in a distributed learning environment.

### **Design Matters: Tech Tools and Software Skills**

Since data visualizations are part and parcel of constructing both technical/scientific posters and oral presentation slide decks, it is reasonable to assume that students will have at least minimal experience communicating visually, gained either from other college courses or high school classes. However unless they are from a creative arts background, it is unlikely that students will have experience using more advanced graphic design tools such as CorelDraw or those belonging to Adobe's Creative Cloud (formerly Creative Suite), including Illustrator, PhotoShop and InDesign. Therefore the infographic assignment can do triple duty as a research project, a design challenge, and an opportunity to encourage students to develop their technical fluency by experimenting with new software applications. The prospect of doing so, of 'learning a skill that requires many visible mistakes, failures and struggles can be a terrifying prospect' however (Tinapple, 2013: 380). One student confessed, 'This course has really forced me to get out of my comfort zone on the computer,' a sentiment echoed by several others (Student FILM240). As a result, online students are especially likely to engage in some extracurricular, self-directed technology tutorials, to boost their digital design skill-set. As one student commented:

This assignment was tough! It took a while but it was so worth it when I looked at my end product! It really exercised my Photoshop skills because I was constantly searching for techniques and tutorials online and ended up with an even bigger and better set of skills (Student FILM260).

On the other hand, it is not always the case that students will respond to the infographic creative challenge by investigating extra online tutorials, as was evident in both of the teaching cases described above. Instead, a significant percentage of students will opt to use the digital tools that are most familiar to them, whether those software choices are well-suited to the infographic assignment or not. For example, in Case #1 at Queen's University, 22% of students used Microsoft Word (best suited to essay-writing), and 29% used Microsoft PowerPoint (the software of choice for slide presentations) to create their infographics.

In an interdisciplinary group such as the ones profiled in this study, where there are as many registered students with a science or engineering background as there are students from arts and literature programs, as well as business students and part-time lifelong learners, there is likely to be a wide range of graphic design skill levels present. Some of the most frequent student feedback received communicated students' appreciation for a challenging assignment that afforded them the opportunity to master new, practical digital competencies. 'My Photoshop skills completely improved during the process,' one student commented, 'and I am now proud to say that I feel comfortable using it and I have learned a new skill that is strong to have' (Student FILM260). Not just a pretty picture, at the outset the infographic assignment may seem relatively easy and simple to create, but students soon realized the pre-planning process takes considerable time and effort. 'I was very surprised,' one student confessed, 'with how something that seemed visually simple could have actually taken days to design' (Student FILM260). The infographic assignment requires students to use graphic editing computer software and to practice inquiry-based learning to stretch their online search skills and locate the sources to back up their thesis. In reading their peers' creative compositions, students face yet another cognitive challenge: the ability to decipher visual messaging.

### **Social Engagement**

After completing the research and design tasks, students uploaded their infographics to the learning management system discussion forums, in order to receive peer feedback on their work. On average, students received between 5-10 comments about their graphics over a two week period, ranging from the brief but encouraging: 'good job, I love your use of color!' variety, to lengthy in-depth commentary and informed close questioning about both design process and subject matter. Those students who posted their work early tended to receive more feedback than those who left submission until the proverbial eleventh hour, an effect that did not go unnoticed by their peers. Many students commented that the online publication portion of the course inspired them to complete their assignments as early as possible, to benefit from the first responder advantage in terms of audience engagement.

Through this peer-to-peer critique, students gained valuable insights on the impact of their design choices as well as comments regarding the clarity and novelty of their argument. When peer reviewed, those infographics that resembled Wikipedia entries, providing a basic encyclopaedic overview of a topic, generally received a less enthusiastic reception from peers than those infographics that presented a compelling argument and articulated a clear position. Through even a cursory comparison of the quantity and quality of comments left on their own and others' data visualizations, students could immediately grasp the impact of strong composition, a clear and compelling thesis, and thoughtful narrative organization for inciting reader engagement. 'Having no previous experience working in this way or doing an infographic,' one student reflected, 'I found it most beneficial to see other peoples work to help my creativity' (Student FILM260).

By attaching course credit to this feedback, students were incentivized to participate in the peer critique in order to get full marks on their assignment. In past years over half

of those enrolled in the course exceeded expectations for infographic peer critique, posting far more comments than were strictly required to achieve a passing grade. This productivity indicates an authentic interest in, and enthusiastic engagement with each others' work, and resulted from the sustained social conversations that developed between authors and audiences on the LMS discussion forums. Infographic student authors routinely reported that all engagement with their work was sincerely appreciated and even enlightening, since in many classes, this kind of public dissemination and social exposure of student assignments is not enabled. Boosting self-confidence, increasing class cohesion and community in an online environment, and inspiring peer-to-peer learning, the forum critique aspect of the infographic assignment also serves very a practical purpose in a very large class, by enabling timely individual formative feedback.

### **Not Just a Visual Assignment: Reflective Writing**

Although infographics may be used in lieu of a traditional research essay, it is possible to combine the visual design elements of this assignment with some reflective writing. Pairing the graphic with a short essay or questionnaire requirement, students can be prompted to comment on their research journey, their creative process, the digital tools they used, and if a peer critique model is used in the course, asked to reflect on the quality of feedback received from classmates. By engaging students in such metadiscussions about scholarly practice, they are encouraged to articulate their opinions about the relevance of the assignment, to describe the challenges they encountered, and to provide ideas for improving the assignment going forward. In the example of Case #1 described above, students submitting a 'designer statement' short answer questionnaires were inspired to write far longer self-reflections than expected. Together the class submitted 45% more writing content than required by the assignment guidelines.

When asked to differentiate between traditional essay writing and creating an infographic, somewhat surprisingly, most students commented that there are more similarities than differences between the two assignments. In their self-reflections, nearly all students emphasized their understanding of the importance of thorough research, a concise thesis, a well-organized outline, and compelling visual rhetoric to create a successful infographic. Through peer-to-peer feedback, a variety of composition issues surfaced: peers presented critiques of information density versus clarity, and asked questions about aesthetics versus utility (Chong 2012: 1). As such, the infographic assignment inspires students to practice strong multimodal communication skills – without requiring the instructor to rehearse basic composition lessons that students have heard repeatedly since high school (Stroupe 2000). For example, although no mention was made beforehand of the need for infographic authors to have a clear outline and to craft some transitions to enable a smooth narrative flow – both of these composition principles were mentioned repeatedly by students in their reflections on the assignment. For this reason, instructors have used infographic assignments to model computational thinking patterns (Krauss, 2012). 'I found that, similar to when I write an essay,' one student remarked, 'I had to draw myself a flow chart and design my layout before I began the creation process' (Student FILM260) Likewise, this assignment enabled students to demonstrate their skills in

tightly focusing an argument around a concise thesis, and eliminating all the extra research tangents they might be tempted to include in a traditional essay. In this way the infographic assignment can be used to teach students how 'to condense data, to present as much data as possible, and yet to find ways to most efficiently display that data' (Chong, 2012: 1). Students commented about feeling the creative constraint of the infographic format, such that it required them to stick to a single topic, and be very selective when choosing a few key illustrative points to support their position, assertion or argument.

### **Infographics and Critical Information Filtering**

EID100 Students generally expressed positive feelings towards the infographic assignment. For example, one student commented in a blog post that 'I believe one of the best ways to transfer your ideas to anyone is to make an infographic [sic] but an infographic should be easy to understand and aesthetically pleasing [as well as provide] graphical contents and useful information' (Student EID100). Another student commented on the usefulness of infographics by writing 'The medium is a key part of the message, not just a way to make the message simple and attractive' (Student EID100). Yet another student wrote that the process of creating an infographic was 'especially great for displaying dull or complex data in a way that's more visually engaging, and easy to understand' (Student EID100).

Overall, students seemed excited about the opportunity to take complex information and display it in pictorial form. In addition, as they engaged with this activity, they were developing skills related to the critical processing of key content from the course. For this activity, students needed first to identify their intended audience and then choose the best material for that audience, filtering out that which was less important to their main idea. Many of the students' reflective blog posts about the infographic assignment discussed this process of making choices about data inclusion. Students reflected on the need to prioritize some information over the rest. In doing so, they were encouraged to develop a key digital literacy skill – that of information filtering. As such, the infographic assignment served as an experiential learning tool that allowed students to apply key competencies necessary for the digital skills class, namely, content curation and content production. Much like the content aggregation and curation techniques described in Wilkes and Hodson's recent paper (2013), the infographic assignment requires an (albeit lower) level of critical content analysis, audience identification, and message construction that can help students learn a variety of skills related to professional communication. Visual pedagogy, like other forms of rhetoric, requires students to make 'a coherent story out of the scraps of information they possess' (Danis, 1993). The students' reflective blog posts show that indeed many are aware they are utilizing these skills.

### **Recommendations**

Overall, the experience of using infographic assignments in both FILM260 and EID100 was a positive experience for both students and instructors. Through a comparison of the differing approaches used in both courses, three best practices emerge that can guide instructors who wish to develop a similar assignment in their classrooms. First, for students registered in an academic program in which graphic design is a required

skill, the infographic assignment can be an excellent opportunity to practice working with Adobe Creative Cloud or the like. However for those courses composed of students from a variety of academic backgrounds and levels, opting for a semi-automated online design tool such as picktochart or infogr.am may be more practical, and may help to level the playing field among students, to take the assignment from a design-focused activity to one with a focus is on information processing and critical analysis. Secondly, pairing the visual design component of this assignment with a short reflexive writing prompt greatly increases the value of an infographic activity. However to get even more value from those writings it is ideal to share them, alongside the images, online – perhaps via a blog or LMS forum – to let students benefit from peer review and create course community and cohesion. This peer critique is especially helpful in larger courses where instructors may be managing a heavy grading load, to accelerate and increase the feedback students receive – since their peers are likely to be first responders. Lastly, although infographics can be used as relatively quick and low-stakes assignments, if they require students to do substantial original research, the infographic can effectively stand in for an essay, and be more heavily weighted toward the final grade. Since infographics require similar critical content analysis and filtering skills as an academic writing assignment, they can be an effective way to teach these skills to visual learners. Furthermore, doing so adds freshness and variety to the standard college assignment mix, and introduces a creative innovation welcomed by student creators and instructor-graders alike.

### **In Closing**

Visual digital literacy competencies are essential for 21st Century learners across the disciplines. Certainly there are field-specific visual communication styles, expectations and norms, and the experience of designing an infographic can serve to enrich students' understanding of their own disciplinary specific requirements and offer an opportunity to engage students in reflecting upon questions of audience (Chong, 2012). For this reason, the data visualization assignment is particularly well suited for online and blended courses that combine full- and part-time students from across the disciplines, as was the case in the two summer course snapshots included here. Student feedback reported the usefulness of this assignment across various academic fields and in the workplace, as students honed their practical digital software skills. As is the case with most internet-enhanced teaching, the digital research, design, and publication experience proved very motivational for students of the 'digital native' cohort (Tinapple, 2013; Lee, 2011). 'I love the fact that I am able to use both the information and skills that I have learned in this class, and apply them to other areas of my life!' one student wrote (Student FILM260). Moreover, the infographic challenge is a good example of the kind of high-impact learning experience that is in-sync with the expectations of today's millennial students. As Gen Y learners arrive in classes on campus and online, they are eager to use digital tools to experience 'a more dynamic interaction and a more active role in their learning process' (Rockenback and Fabian, 2008). Lastly, for fostering a cohesive online learning community, this assignment is particularly effective insofar as these visually interesting, concise and convenient-to-read infographics encourage sustained and substantial peer engagement (Walter, 2012). As one student confirmed after reportedly reviewing dozens of her peers'



graphic designs, 'there's no way I would have the attention span to read that many [student] essays' (Student FILM260).

When asked why learning to design and decipher infographics matters, students' top response was that these evocative visual artifacts enable faster and more efficient communication, with the potential to reach and resonate with a large online audience composed of diverse publics. The experts agree, since 'these new visualization techniques are spreading and evolving rapidly across media outlets – in print, online, and even on television – as authors and institutions struggle to communicate in more compelling ways with their audiences' (Chong, 2012: 1). Using graphic representations and visual data enables users to communicate a message that can be perceived widely across diverse audiences (David and Glore, 2010; Mocek, 2012; Metros, 2008). By hitting the sweet spot between linguistic and nonlinguistic systems, supporting information fluency and creative digital expression, infographics help students build critical faculties required to make sense of complex online communication and commercial systems (Krauss, 2012). Encouraging students to develop multimodal literacy skills and new visual digital competencies thus prepares them for opportunities to actively participate in creating, consuming, and critiquing our contemporary digital culture arrangements.

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### **Appendix 4: Links to Infographic Tools**

All tool descriptions below are copied from Wikipedia or Google. Pricing for many of these tools is free to try with membership plans available. Most have educator discounts.

Adobe Creative Cloud 'a service from *Adobe* Systems that gives users access to a collection of software for graphic design, video editing, and web development'

<http://www.adobe.com/ca/products/creativecloud.html> Pricing: Monthly subscription, educator and student rates available approximately \$20/month.

Piktochart 'a web-based infographic software which allows users without intensive experience as graphic designers to create professional-grade infographics' Pricing: Free.

Infogr.am 'an information graphic designing tool' <http://infogr.am> Pricing: Free.

Pixlr: 'a cloud-based set of image tools and utilities, including a number of photo editors, a screen grabber browser extension, and a photo sharing service.' <http://pixlr.com> Pricing: Free.

## **WAC in FYW: Building Bridges and Teachers as Architects**

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### **Abstract**

Students entering the first-year writing classroom directly out of high school often tell me that they had to 'write differently for each teacher and class.' Imagine their confusion and apprehension when they are told that one of the objectives of FYW is to prepare them for *academic writing across all disciplines*! How can teachers incorporate cross-curricular skills into their lessons? More importantly, amongst the already-complex demands on the purposes and goals of FYW courses, how do students learn these techniques that teachers deem 'easily-transferrable'?

I argue, first, that the FYW classroom is an ideal location to present students with the individual tools for writing in *any* discipline. We discuss elements of writing like organization, idea development, thesis statements, citation, and the writing process within our courses as part of the standard curriculum. Therefore, I argue that the multi-faceted roles of FYW teachers include the characteristic of architect, and assert that transforming our lessons into WAC lessons involves the incorporation of examples, standards, and formats from outside disciplines. Mentioning how thesis statements tie together English and Religion papers or how dividing a paper into sections enhances the organization of Biology lab reports and Business reports establishes connections for students. With some simple additions to teachers' lessons, students will find that the writing techniques they learn are just as crucial and useful in both core and major classes. Building these bridges reinforces the lifelong importance of writing and helps students continue to develop their writing skills across and through the college curriculum.

**Keywords:** first-year writing; WAC; academic writing; connections; curriculum; instructors

### **Introduction**

Building a structurally-sound bridge that connects two places first requires the development of an intricate blueprint. Such a detailed plan calls for a knowledgeable architect—one who can see across the divide and envision the final product that will link one piece of land to another. On the map of many universities, these separated areas of land are First-Year Writing (FYW) courses and Writing across the Curriculum (WAC). Not surprisingly, then, when students first arrive at the university, they often

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