Review research paper

EMPLOYING STUDENTS' CREATIVITY AND COMPUTER SKILLS: USING INFOGRAPHIC-CREATION AS A TOOL IN BUSINESS ENGLISH CLASSES

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Abstract. *The article will focus on the use of infographics in teaching Languages for Special Purposes (LSP). The benefits of using infographics in marketing, tourism and other business areas are well documented and business students profit from learning how to use and create these tools of information dissemination. In the classroom, infographics can be used on two different levels: firstly, they can be an input to students to facilitate learning and secondly, students can create infographics themselves.*
The first part of the article will focus on using infographics as an input. Infographics have been found to accelerate the learning process: The brain processes images faster than text and there is evidence to show that using images together with text enhances understanding, speeds up learning and makes it easier to recall information. Images in general and infographics in particular also help visual learners who find it easier to learn by viewing charts, maps and diagrams instead of words.
In the second part of the article, I will argue that when students create infographics, they reap an even bigger benefit. Making such a combination of words and images requires a clear understanding of the text read and a deep knowledge of the topic. Such a task requires an ability to select and organize relevant information, use critical thinking and exercise creativity. It also builds students' transferable skills, such as, visual literacy and computer skills. Furthermore, students' motivation is also enhanced when they feel that they are learning something that is seen as a modern, "cool" way of communication with their peers or business partners.
In the third part of the article, I will make recommendations on how to incorporate infographic-creation tasks into an LSP classroom.

Key words: *infographics, information retention, digital tools for teaching, note-making, Business English, LSP*

1. INTRODUCTION: WHAT ARE INFOGRAPHICS?

Information graphics or infographics are graphic visual representations of information, data or knowledge intended to present information quickly and clearly. They are usually a mixture of text and images designed to make the data easily understandable. Infographics

are useful because they communicate a message quickly, simplify the presentation of large amounts of data and make data patterns and relationships easier to spot. All of these are important considerations in our time-poor world, when we need to digest a lot of information in a short time.

Infographics are not to be confused with data visualization. Infographics use visual tools not only to represent data in an easier-to-understand way, but they combine text, images and data visualization to tell stories, to transmit more complex ideas.

> "Data visualization alone is not the same as infographics but, rather, a tool used by designers to create infographics. Infographics can convey a certain subject in a story-like presentation using a variety of graphical elements and text to present an introduction, details, and conclusion, whereas data visualization only provides a snapshot of a single moment within the story (Dur, 2014, p. 41; Islamoglu et al., 2015, p. 34). In sum, data visualizations are isolated representational forms, while infographics are powerful standalone representations that convey an entire message quickly and clearly "even without accompanying text" (Davis & Quinn, 2014, p. 16; McDermott, 2014, p. 37)." (Alrwele, 2017, p. 105)

Visual representation of data and information is not a new phenomenon, it has been around for thousands of years: maps, the periodic table, famous examples of early infographics, such as "Ancient Egyptian hieroglyphics, or Leonardo Da Vinci's illustrations of the human anatomy in the 16th century" (Ferreira, 2014) are often cited in the literature. Journalists have also long used infographics to make news items more attractive and easier to understand. By the 1980s, when computers became widely available, "*The New York Times* regularly published sophisticated infographics, whereas *USA Today* started publishing infographics as a way of delivering the news daily to serve information snack-style by way of simple polls turned into easy-to-digest nuggets" (Ashman and Patterson, 2016, p. 615).

Worldwide interest in infographics (as demonstrated by Google searches on the term "infographics", See Fig. 1) started to grow in February 2009 (5 on a scale of 1-100) and reached its first peak in February 2014 (94). While this interest dropped somewhat afterwards (60-80), March 2020 brought a new peak of interest (100). More recently, the data shows that there are fewer searches made for the term, compared to the peak interest, but it is still a term that is looked up quite frequently.
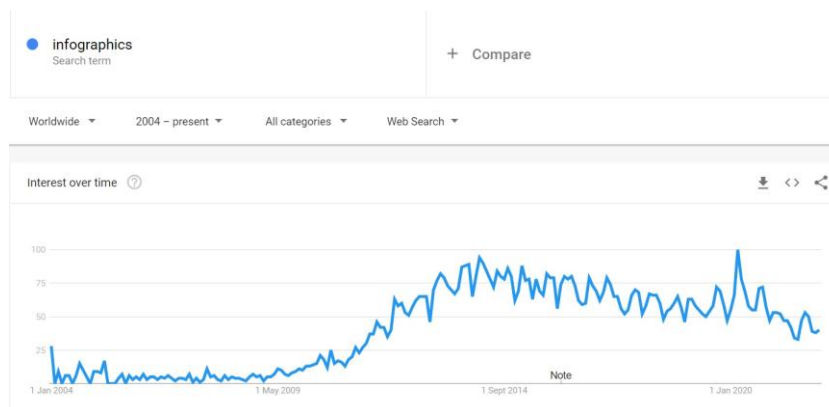

Fig. 1 Google Trends: Infographics (Accessed: 2 Feb. 2022)

1.1 The reasons for the rising popularity of infographics

There are several reasons for the rise in popularity of infographics. One line of explanation has to do with our need to access and process information ever-faster. The reason why infographics would do this better lies in how the human brain works: we digest information coming from pictures faster than information from reading texts. Additionally, we retain the information gained from pictures longer as well. "Approximately 50% of the brain is dedicated (directly or indirectly) to visual functions" (Smiciklas 2012, p. 7). Studies have shown that the brain decodes images much faster than texts. This is because of "the way the brain handles information. It processes data from pictures all at once but processes texts in a linear manner" (Smiciklas 2012, p. 7), that is, it treats each letter as a separate symbol to be decoded.

"Pictures are not only more effortless to recognize and process than words, but also easier to recall. When words enter long-term memory they do so with a single code. Pictures, on the other hand, contain two codes: one visual and the other verbal, each stored in different places in the brain. The dual-coding nature of images allows for two independent ways of accessing visual memories, increasing the odds of remembering at least one of them." (Dewan, 2015)

The fact that people store and recall information more effectively if images are involved in transmitting the information has an impact on how people will later act on the information gained: studies have found that "people following directions with text and illustrations do 323% better than people following directions without illustrations" (Mawhinney, 2018).

The benefits of increasing the speed of decoding information and raising the likelihood of retaining this information become obvious when we consider two phenomena: firstly, our way of reading online, secondly, the fact that people today are inundated with a constant flow of information that needs to be decoded and remembered.

Research shows that people only skim and scan text they find online: "the average person will read only about 20% of the words on a webpage." Additionally, our attention is constantly divided between multiple digital channels to maximize our access to information: this is the behaviour pattern called Continuous Partial Attention (Smiciklas, 2012, p. 12). Grabbing the attention of distracted readers online can be very important for businesses. "Eye-tracking studies show internet readers pay close attention to information-carrying images. In fact, when the images are relevant, readers spend more time looking at the images than they do reading text on the page" (Mawhinney, 2018).

While people crave information and search for it, we also often feel overwhelmed by it. The amount of information online is immense and it is growing rapidly: "From 2013 to 2020, the digital universe will grow by a factor of 10 – from 4.4 trillion gigabytes to 44 trillion. It more than doubles every two years." (Turner, 2014). Under these circumstances it is clear why schools, media organizations and businesses want to make sure that they can communicate with the highest efficiency.

Infographics are powerful tools of communication because they combine text and images and make it easier and faster for readers to get information. "[O]n their own, text and graphics are both useful yet imperfect methods for communication. … Combining text and graphics allows communicators to take advantage of each medium's strengths and diminish each medium's weaknesses" (Miller and Barnett 2010). Infographics can make large amounts of information easier to digest. "Some infographics translated to text

alone would total several pages. Nobody would read that. Anyone who does presentations knows information is retained better when accompanied by visuals." (Sally Falkow, president of online newsroom provider PRESSfeed, quoted in Zuk, 2011). As a result, infographics often replace texts (articles, reports, etc.) in offline and online communication.

The second line of reasons for why infographics are gaining in popularity is their shareability and impact. In the age of social media, one measure of human and/or business success is the number of people we can reach and influence. While this may seem superficial on the personal level, businesses can translate their social media presence into actual numbers of consumers and profit. "Visual storytelling helps businesses, marketers and communications professionals reach their target audience in more meaningful ways than virtually any other type of medium" (Conner, 2017). "Infographics can increase web traffic by up to 12%." (Mawhinney, 2018)[1]

2. USING INFOGRAPHICS IN THE CLASSROOM

Having discussed the benefits of infographics in general, it is clear that business students profit from using infographics for learning about new topics and even creating infographics.

Infographics can be used in two ways in the classroom: 1) infographics supplied by the teacher used as a tool to facilitate understanding of a topic and retention of information, 2) infographics created by the students themselves, where students have to actively think about a topic, create logical connections, organize information and then represent it in a visual form.

The first, less active use of infographics in the classroom is using infographics to disseminate information. One could argue that texts are tried and tested modes of information dissemination, however, today's students seem to prefer "visually appealing information resources with concise textual content" (Brigas& Ramos, 2015; Islamoglu et al., 2015 quoted in Alrwele, 2017, p. 104). "In a study conducted in 2011, Roehling, Kooi, Dykema, Quisenberry, &Vandlen (2010) stated that the new generation of students has been raised in a 'multimedia environment in which they rapidly shift their attention from one source of information or stimulation to another. As a result, these students tend to have a low tolerance for boredom and require high levels of stimulation to remain focused' (p. 2)." (Alrwele, 2017, p. 104)

Alrwele (2017) summarizes Lamb and Johnson's (2014) five uses of infographics for the purposes of teaching: 1) visually illustrating key concepts; 2) visually displaying complex relationships; 3) comparing information and visually representing the differences;

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[1] To show how impactful infographics can be, let's look at the example of KISSmetrics (a web analytics service that tracks website visitors and records their behavior, allowing website creators to see how much they influenced the viewers of their website). KISSmetrics created 47 infographics to build organic search traffic. "Within a two-year period, KISSmetrics generated 2,512,596 visitors and 41,142 backlinks from 3,741 unique domains, all from those 47 infographics. (A backlink is a link on a webpage that points to your webpage. This is one of the ways that Google ranks webpages.) From the social media perspective, in the last two years, the infographics have driven 41,359 tweets and 20,859 likes" (Patel, 2012). Translated into the language of finance: KISSmetrics invested $28,200 into creating the 47 infographics ($600/infographic), buying the same amount of visitors, links and tweets to "try to game Google [to get the same favourable position among search results] and get the same results as we did at KISSmetrics, you would have spent a total of $1,072,905.80" (Patel, 2012).

4) making data more meaningful by providing analogies and examples; 5) presenting information as story, which makes this information more interesting and engaging. We could add a sixth use as well: improving the visual literacy of students, i.e., the ability to make meaning from, interpret and evaluate visual images.

Presenting information visually makes learning about a topic less work. The reason behind this has to do with cognitive load theory (CLT), which explains that when students are "less exposed to the cognitive load, which is the mental effort of the learner in the learning process" they can spend less time learning the information presented because they "can focus more on the content rather than trying to understand the way through which it is presented" (Afify, 2018, p. 207). Of course, it could be argued that making learning less demanding is, in fact, counterproductive and students should learn how to find key information in a text and focus on a topic without help. While this may be true, "evidence from neuroscience indicates that presenting information in multiple ways helps learners because it engages multiple channels for processing the information presented" ("Introduction to Visual Literacy: Learning and Visual Literacy," 2017).

Infographics can be very useful if the aim is to help students retain information. Firstly, the human brain retains information better if it is stored in two places of the brain, once as an image and once as verbal code, as opposed to just once as verbal code (see earlier discussion on dual-coding theory). Secondly, information retention can be additionally bolstered if we consider the story-like characteristic of infographics. A well-designed infographic presents information as a story and not a collection of disparate data. Studies have shown the effectiveness of infographics to "enhance students' comprehension and increase memory retention." One such study was carried out by Al Hosni (2016). In the study, two groups of students were given the same information, but in different formats: one group was given a text, the other an infographic. The group that was given the information via an infographic could retain the information much longer and more accurately than the control group.

Infographics can also be helpful for visual learners. A large part of the student population are visual learners[2]. These learners prefer to be taught through visuals (pictures, graphs, charts, videos, etc.), but usually most instruction rests on the written or the spoken word. These students could perform better if teaching methods better suited to their preferred learning style were offered.

2.1. The advantages of using infographic-creation for teaching purposes

The second, and more demanding use of infographics in the classroom is making students create their own infographics. If using ready-made infographics in class is beneficial for the learning process, creating them is even better.

When making an infographic, students have to "synthesize information, or analyze and summarize data" (VanderMolen and Spivey, 2017, p. 199) form logical connections and then present them in a clear and easy to understand way. A well-designed infographic shows a clear understanding of the topic.

Creating infographics requires similar reading and meaning-making strategies as taking structured notes (i.e. graphic organizers, Jiang, 2012). Reading for note-taking and

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[2] There is no consistency in the data on the actual size of this student population, but it seems to be somewhere between 30% and 40%.

creating infographics requires that the note-taker understands the text both on the local and on the global level and mentally "constructs an organised representation of the text" (Weir & Khalifa, 2008, p. 4) which then can be put in a graphic form. Local comprehension entails understanding the words and individual sentences in the text, while global comprehension means being able to identify the general meaning of the text (Weir & Khalifa, 2008). When taking structured notes, the first step is to separate the important / relevant details from the unimportant / irrelevant. Once that is done, logical connections and relationships have to be established between the important terms and expressions. Successful notes or a well-done infographic reflect these logical connections.

Research also shows that a larger part of the brain is at work in global text comprehension than in word-level tasks (Aboud et al., 2016). This suggests that deeper cognitive processing can be expected from students searching for logical relations across the text while trying to establish its macrostructure (Sladoljev-Agejev, 2018). As a result, a higher level of retention and involvement with the topic can be expected when making notes or creating infographics.

VanderMolen and Spivey's (2017) experience with infographic-creation with a group of health economics students shows that students are motivated by the opportunity of creating infographics and respond well to this type of task. Students' feedback on the exercise was overwhelmingly positive. It was seen as a good opportunity for acquiring a useful new skill and also found the experience fun and engaging, more so than writing a short paper on the same topic. Additionally, 88% of students reported an increased interest in health economics after taking the course, while the control group's interest stayed the same.

The process of infographic creation improves the production side of visual literacy as well. Just as both reading and writing are considered an integral part of being literate, being visually literate involves being able to interpret and also create visual images.

2.2. Incorporating infographic-creation tasks into an LSP classroom.

Infographic-creation can be taught in many different courses, ranging from information sciences, life sciences, design, marketing, etc., to LSP. Each of these courses would have different intended learning outcomes, and thus a different focus and expectations when teaching and then evaluating students' work. An LSP class's focus has to be on language and communication. When communicating through an infographic, students need to research and understand a topic, choose relevant information (analyze and synthetize information), compose short and meaningful texts to be included in the infographic, organize information and use meaningful visual elements to support a strong and clear message. The learning outcomes are the following: While creating the infographic, students build their vocabulary in the LSP and learn about the topic researched, but even more importantly, they implement cognitive processes that are needed to create the infographic while using a foreign language for specific purposes.

Additionally, infographic creation in an LSP class is also an activity that combines the use of linguistic and computer skills in the classroom, i.e., it is an "interdisciplinary approach to learning of ESP contents." (Milošević, 2017) At the same time as improving students' LSP skills, they also develop their computer skills.

When incorporating infographic-creation into an LSP course, it is very important that students do not feel overwhelmed by the many different aspects of creating infographics (design, language, text, data usage and visualization, etc.), therefore they need to be given support and clear guidance on what is expected of them and how their work is to be evaluated.

2.3. How infographic-creation was introduced into Business English 3 at the Faculty of Economics and Business, University of Zagreb

Teaching with infographics was introduced in Business English 3 in 2018. This class is attended by 3rd - 5th year students with a range of different majors offered at the Faculty of Economics and Business, Zagreb (Tourism, Accounting and Auditing, Management, Finance, Trade and International Trade, Managerial Informatics, etc.).

Originally, making notes on a text was one of the tasks that students were graded on in Business English 3. Making notes is a topic that is introduced in Business English 1 and practised in Business English 2, which are compulsory courses for first-year students at the Faculty of Economics and Business, Zagreb. The intention in Business English 3 was to further develop this important skill. However, students seemed very unmotivated by this task and in general did not feel that it was a useful activity. This is the point when the thought of introducing infographics occurred. From the point of view of the students, it would be an opportunity to create something visually pleasing; it includes the use of a new computer program or application, and the learning of a real-life skill that students recognize as useful. Last, but not least, it is something different from their usual tasks.

From the teacher's point of view, creating an infographic brings all the advantages discussed above. Another reason why this exercise is of benefit lies in the fact that making an infographic based on a longer article involves focusing on a single message. A good infographic carries a single clear message, while articles often have more than one message that they want to impart to their readers. In the course of creating an infographic, students have to choose a message and be selective about what to include in the infographic in order to make an impact. Focusing on what is important and being selective with information is a cognitive skill that students need to practice.

2.4. How were students prepared for the infographic creation exercise

Business English 3 is a course where there is a large emphasis on reading and interpreting complex texts dealing with current topics of economics e.g., inequality, behavioural economics, universal basic income, just to name a few. Students have to read texts of 4-5 pages for class and answer questions based on the texts. This requires that they comprehend the article on both the global and the local level, understand key vocabulary, form connections, analyse information and make interpretations. The questions direct students to be able to focus on what is important in the text. In answering the questions, they have to practice their skills of interpreting, paraphrasing and summarizing information. All of these skills are also required for creating infographics.

In general, students are always encouraged to create notes on the articles they read, but one class is specifically geared towards creating notes on the article assigned for that week. During this class, we discuss and revise the effective use of bullet points and the importance of using different levels of notes. One of the common errors that students make when making notes is that they copy whole chunks of text instead of paraphrasing and summarizing important points. The other common error is putting all bullets on the same level, instead of structuring them in hierarchies and in that way indicating relationships in the text. These errors are discussed and better note-taking solutions are proposed.

Another class (3x45 minutes) is dedicated to teaching students about basic rules for creating infographics, and explaining to them the type of infographic they need to create for the class. The homework assignment for this class is for students to find two infographics:

one good and one bad. They have to give reasons for their choices. The students are helped in making this decision by a list of criteria provided by the teacher (See Appendix 1). All students are required to put their chosen infographics in the same shared Google document[3], and they are told to look through their colleagues' choices to avoid posting the same infographic twice and also to comment or think about the infographics in the document. This exercise is useful in a number of ways: 1) Students typically look up sites which list good and bad infographics. While choosing the two infographics to submit for class, they read about the reasons why some infographics are good or bad. In this way, they learn about the rules of making infographics. 2) By looking at many infographics, they familiarize themselves with the requirements of this form of expression. Learn about logical organization, flow, the importance of white space, etc. 3) Having to look at the infographics their classmates posted to make sure that they do not post the same infographic twice further increases the number of infographics they look at. They also read their colleagues' comments about the infographics posted. 4) The criteria they are given for selecting infographics are the same as those that I use when grading their work. In the course of the homework assignment they learn to look out for errors and best practices.

In the class on infographics, students are familiarized with the definition of infographics and their use in communication, marketing, recruitment, etc. is explained. This part serves to motivate students by showing them that reading and creating infographics is a useful real-life skill. Afterwards, basic rules for creating good infographics are clarified. Once they are familiar with the rules in theory, we look at their contributions of good and bad infographics. We go through some of the more interesting submissions and discuss what the strengths and weaknesses are. Then they are once again presented with the criteria of appraising infographics and with an infographic that has some good qualities but also some serious flaws (Appendix 2). Students are given time to appraise the infographic on their own, then a class discussion follows in which students are encouraged to criticise the infographic and discover its flaws. In the final part of the class, we look at one of the infographic creator applications available online (Canva). The basic functions and options are explained to students. This serves the purpose of quelling the fears of some students who feel that they might not be computer-literate enough to use such a program. After the class, further materials and tutorials on creating infographics are sent to students.

The task that students got in 2020 and 2021 was to create an infographic based on an article of their choice on BBC Worklife. Students were told to select an article of around 1700 words in length. By allowing students to choose their own article, my aim was to make students browse a large number of texts before choosing the article they would eventually turn into an infographic.

Before getting to work on the infographic, students had to submit their article to the teacher. Most often the articles were approved, I only asked students to find another article, if their choice was a listicle: an article that is basically a list of things with extended explanations. These types of articles would not be a challenge to turn into an infographic and would not really require the practising of the above described skills to create an infographic.

Students are given 4 weeks to complete the assignment, during which time they can ask for help with the technical part of creating infographics. The infographics are evaluated

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[3] Shared Google documents allow students to work in the same document simultaneously.

based on the evaluation grid in Appendix 1. The grid is given to students before they start working on their infographics.

2.5. The infographics created by students

There were numerous very creative infographics submitted by students, some of which were included in a virtual exhibition of the best works on the website of the Faculty of Economics and Business. Students who created these followed the rules explained to them and made infographics which conveyed a strong message in an easy-to-understand way. Students also took obvious care to make the infographics attractive and reported that they enjoyed the opportunity to be creative and think about the best design for their topic.

Identifying common errors is always interesting from the point of view of the teacher, as it helps in improving teaching practices for future generations. Certain trends of common mistakes could be identified. One of these common errors was when students tried to include too much in the infographic. These students felt that everything that is in the article needs to be included in the infographic as well. By not being selective enough with the article and not limiting their work to just one main message their infographic lost focus and often became confusing. The inverse of this mistake could also be found. These students picked out only one thought to be represented on the infographic. Being too selective meant that the message was not conveyed in full or was not supported by proper arguments, resulting in an unconvincing infographic.

Another group of common mistakes concerns the use of text in the infographic. While it is alright to take some sentences from the original article, copying whole chunks of text into the infographic is not going to result in a coherent work. The language used in an infographic needs to be much more concise than in an article, therefore, students need to summarize and paraphrase for the purposes of the infographic. Students who did not understand this, ended up with infographics that had too much text on them, without effectively communicating the message they wanted to impart. The opposite of this error can also be found: this is when students include only very sparse notes on the infographic which then is not intelligible for anyone who has not read the original article.

Design issues were also found in some infographics. Infographic-creator programs offer ready-made templates to be used for infographics. If the wrong template is used, the infographic will be harder to follow and understand. For example, if an infographic is about the evolution of an idea, it is best to use a time-line template. If students instead select a comparison or mind-map template for such a topic, the infographic will not be successful. Students who choose the wrong template do so usually because they did not fully grasp the global meaning of the text, and/or are not clear about the message that they want to impart with their infographic.

Another design error is the wrong use of icons. As it was explained above, infographics blend visual representation of information with text to become more efficient forms of communication. Not taking advantage of this feature decreases the effectiveness of the infographic. In some cases, students used no or very few icons, and in others they used icons, but these were not related to the topic at all. They were there merely for their decorative value, not to promote the message. All of these issues make the infographic less effective.

3. CONCLUSION

Infographics are high-impact tools of communication that are becoming more and more common on the Internet. They facilitate easier comprehension of complex issues and easier retention of information.

Infographics are also useful learning tools. They can be used either 'passively' or 'actively.' 'Passive' use means that students are presented with information through infographics in class. These have the effect of aiding the understanding of a topic, motivating students to learn about a topic, helping the retention of information, promoting visual literacy and assisting visual learners.

The active use of infographics, i.e., their creation, carries further advantages: students learn to "synthetize information, analyze and summarize data" (VanderMolen and Spivey, 2017, p. 199). They employ higher level reading- and meaning-making strategies, learn to separate the relevant from the irrelevant, form logical connections and process information on a deeper cognitive level, which leads to a higher level of retention and recall. Infographic-creation expands visual literacy (production side) and computer skills. The fact that students learn a new skill which can be useful in their future profession is motivating.

Introducing infographic-creation into the syllabus in an LSP class encourages the expression of complicated information clearly, it requires a higher level of engagement with the material and thus engrains the target language deeper.

APPENDICES

https://www.dropbox.com/s/0f45w7dj7mlozku/APPENDICES-
%20Infographics%20in%20LSP.docx?dl=0

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