



Bringing the ‘Dismal Science’ to Life: Teaching Economics through Multimedia

Wayne Geerling

Abstract

This article examines the pedagogical benefits of using multimedia in the teaching of economics at undergraduate level. It also provides an example from my own teaching to serve as a reference for lecturers interested in creating an interactive learning environment, which prompts genuine two-way discussion in the classroom and produces better learning outcomes for students. The final section ties in the use of multimedia with broader debates among economists about the appropriate level of government intervention in the economy. The paper concludes by arguing that the use of multimedia has strong pedagogical advantages in stimulating greater student engagement and helping to rectify the image of economics in the wider community. Lecturers interested in using multimedia in their teaching will find an extensive list of web resources at the end of this paper.

JEL classification: A22

1. Introduction

Starting Point: Teaching and Learning Economics, an online website designed to assist economists in developing innovative teaching strategies, illustrates the benefits of using multimedia to reinvigorate the way we teach economics: ‘The use of media to enhance teaching and learning complements traditional approaches to learning. Effective instruction builds bridges between students’ knowledge and the learning objectives of the course. Using media engages students, aids student retention of knowledge, motivates interest in the subject matter, and illustrates the relevance of many concepts’ (Mateer, 2011)¹. Historians debate the origins of the term ‘Dismal Science’, but Thomas Carlyle’s antipathy towards the discipline of economics continues to resonate in the community². Bad teaching practice reinforces the notion of an abstract science out of touch with the modern world.

This paper will evaluate the different forms of, and benefits in, using multimedia in the classroom, then by drawing on an example from my own teaching, provide a practical illustration of how multimedia—in this case a film clip made by my students—can be used to liven up the economics curriculum and create an interactive learning environment, which is student-led and produces better learning outcomes. The caveats of using this technology in a lecture—mainly the questions of when and how—are dealt with. Next, I provide a brief overview of the film competition, before moving on to discuss the themes of the

¹ All hyperlinks are given in web resources used, at the end of this paper.

² One view is that it was a reference to the gloomy predictions of Thomas Malthus. Another traces the comment back to Carlyle’s attack on economists for opposing the reintroduction of slavery.

clip, in both a narrow and broader context. This section contains several sample questions which could be used to prompt discussion or be set for homework and links to further (interactive) resources.

Media can be used in almost any discipline to improve student learning in a variety of forms, both in-class (lectures and tutorials) and out-of-class (homework, offline/online assignments, essays and projects). Research shows that the use of multimedia or popular culture can stimulate discussion in introductory classes (Becker, 2004), illustrate basic concepts (Hall, 2005; Hall and Lawson, 2008) and explain abstract concepts like game theory (Dixit, 2005) or option value (Dixit, 2011) at an advanced level.

I have always used a variety of multimedia resources in my teaching: from commercials, film, music, television and YouTube clips in lectures to interactive-based homework, which requires students to read newspaper articles, report on economic trends or listen to/watch Podcasts/Webcasts. This illustrates how the theory they have been taught relates to the real world and promotes independent learning. Students are then tested on this material in the following week's tutorials through class debates, presentations and written tests. Topics are always contemporary and relevant, e.g. '\$26 boost to minimum wage' (unemployment), 'Man drought hits Central Australia' (personal relationships) or 'Generation Y drowning in debt' (higher education and debt).

Students have different learning preferences. While those with a background in science or maths may have a comparative advantage in understanding the quantitative aspects of economics, research shows that people learn abstract, new and novel concepts more easily when they are presented in both verbal and visual form (Salomon, 1979). Visual media also make concepts more accessible to a person than text alone, promote deep learning rather than rote learning, and help with later recall (Cowen, 1984; Willingham, 2009).

The use of media is beneficial for teachers and students alike. Technology plays an important role in creating an interactive learning environment, which prompts two-way discussion in the form of student-created content (Bransford *et al.*, 2000). Media sources are ideal for illustrating complex ideas in a short period of time, connecting learners with events that are culturally relevant and theories taught in the classroom with real-world events and policies (Mateer, 2011).

Using media of popular culture familiar to students is likely to: (i) maintain attention and student interest in the theories and concepts being taught; (ii) develop better analytical skills by analysing media using the theories and concepts they are studying; (iii) break down the barrier between formal learning and understanding, enabling students to see concepts and new examples when they use these same media in their private life (Mateer, 2011).

Before using audiovisual materials in teaching, one should have an understanding of copyright, which, by default applies to materials found on the web. The Economics Network's *The Handbook for Economics Lecturers* provides useful instructions on this issue³. Permission to use these materials might be requested directly, or granted in advance using a licence such as Creative Commons (Poulter, 2010). The biggest hurdle in using audiovisual materials—aside from a willingness to do so—is the workload involved and the skill in recognising content that will enhance learning, instead of becoming a distraction (Mateer, 2011). The good news is: help is readily available.

- The *Mathematics for Economics: enhancing Teaching and Learning* (METAL) site has a series of short clips which can easily be embedded into any lesson plan.

³ The hyperlink is provided in the references section.

- *TED-talks* are well-produced video lectures of 15-20 minutes on themes as diverse as business climate, developmental economics, environmental issues and globalisation.
- Dirk Mateer, an academic from Penn State University, created *Teaching Economics with YouTube* to showcase in-class videos and provide links to economic content provided by other YouTube users.
- Mateer, along with other North American academics, pioneered or helped pioneer websites which provide economics lecturers with access to short clips from films, television shows and music. The clips usually include a synopsis, relevant concepts and, occasionally, sample questions which can be used in open-ended, student-led assignments. Examples include: *Economics in the Movies*, *TV for Economics*, *From Abba to Zeppelin*, *Led* and *Flash Music for Economics*.

The use of YouTube throws up one interesting extension of this medium: filming classroom experiments and/or getting students to make their own clips. After all, most of them belong to Generation Y. This can be used to give students 'ownership' of their own learning and extend the two-way discussion highlighted above.

2. Background

The Economics Network launched a student film competition in 2005–06 on its website for school students considering studying economics at university: *Why Study Economics?* (WSE). The aim was to encourage students from around the United Kingdom (and beyond) to make videos about their experiences. These videos are available on YouTube and most can be downloaded for offline use from the student films section of the WSE site.

My favourite clip is 'Captain Economics', in which a mysterious masked super hero helps university students solve everyday dilemmas: time preference (the impact of budgetary tax increases on the price of cigarettes, alcohol and going out); how the laws of supply and demand affect finding a partner at a nightclub; using comparative advantage and specialisation to decide who does the cooking in a shared house. Student-generated content can be used to enrich the learning experience by illustrating themes which are relevant and interesting to the lives of most young people.

I trialled this form of assessment in 'Economics of Everyday Life', a new 2nd year elective I introduced at La Trobe University in Melbourne, Australia, in 2010. The aims of the subject were to encourage students to:

1. Think like an economist;
2. Explain the intuitive logic of economics;
3. Apply economic reasoning to comprehend and solve problems in everyday life;
4. Better understand the complexities of human behaviour.

'Economics of Everyday Life' was aimed at different streams of students: those undertaking a degree or considering a major in economics, as well as non-specialists from different faculties opting for an elective.

The film project was optional and one video was submitted. One of the students has a background in media studies and was able to use his expertise in production and editing to ensure a high quality end

product. Even the acting was believable! Their project will be discussed in more detail in the next section of the paper. In future years, I intend to make the film project compulsory, but as a concession will allow students to form their own groups to try to minimise the incidence of free riding. This has the potential to create a lot of administrative work for the academic. SWORD, a web-based peer review system, can help. It randomly assigns students within groups and creates the correct incentives for serious peer review of film projects (Cho *et al.*, 2006; Cho and Schunn, 2007).

Instructions in the subject outline were as follows: 'Each group will choose their own topic, which should be based on an aspect of how economics is relevant to everyday life. The clip should be no longer than 5 minutes in length. Students will be given practical demonstrations of how to use the audiovisual equipment (if necessary) but most of the work will take place outside the traditional classroom. The best clips will be uploaded onto YouTube' (ECO2EEL subject outline: semester 2, 2010, p. 10). Aside from approving the topic, students worked independently.

3. Film clip

A group of four students tapped into a controversial issue for staff and students alike at La Trobe University: car parking. The idea evolved accidentally from a theme I raised in a lecture on 'University Life'. Titled: 'Car Parking at La Trobe University: Is this a Case of Market Failure?', four self-described student economists set out to determine whether the shortage of car parking places is the symptom of market failure or a transitory adjustment in the market. It draws on themes taught at the beginning of Introductory Macroeconomics and Microeconomics (scarcity, opportunity cost, tradeoffs, thinking at the margin), plus more general microeconomics concepts: free riding, externalities, market failure and government remedies. The chosen topic is suitable for an introductory course in economics, a subject which requires students to apply theory to practical or real-life events, or to reinforce knowledge of previously taught material.

The student film project gave our group a chance to articulate what we had learned during the semester through a different medium. In many ways this was more challenging than a conventional assessment, as the logistical and collaborative issues associated with a group film project required higher developed time management skills (shooting the film, editing, brainstorming etc.) as well as teamwork. The fundamental difference between this project and writing an essay or doing an exam, is that it gave us great insight into working with technology and software and using such tools to convey the topics covered in a concise and entertaining way. If anything, this is what economics lacks! Although the formal areas of economics are necessary and fundamental to the discipline it does tend to make this school of thought quite inaccessible to those whom economics affects the most - the everyday person. Overall it was a great experience and I would like to do it again at some point... (subject evaluation, student 1)⁴

Audiovisual material can be used: (i) at the beginning of a lecture; (ii) after a brief introduction but before learning the concept; (iii) after learning the concept; (iv) before and after. Alternatively, it can be set as a homework assignment (Mateer, 2011). The 'Economics of Poker' is one such clip from Mateer's YouTube channel. Two students are sitting at a table playing poker. The game of poker has several principles taught in introductory Microeconomics: tradeoffs, opportunity cost, thinking at the margin, sunk costs, etc. The beauty of this clip is that it illustrates concepts which should resonate with students, many of whom play the game of poker (though may not necessarily understand the economics behind it). Furthermore, it provokes the viewer to think about more intermediate and advanced Microeconomics concepts: maximisation subject to constrained choices, prospect theory, time and adjustment process, etc., which make it suitable for introductory, intermediate and advanced classes.

⁴ Ethics approval to use student material was granted on the condition that students be anonymised.

A few questions to consider before using audiovisual material in teaching:

1. Is there a clear link between the material shown and the learning objectives? The material should be embedded in the lesson plan, i.e. objectives, how you intend to use it and learning outcomes for students.
2. Will students understand the context, i.e. why the material is being shown? Are there concepts or background material which needs to be explained in advance? With respect to the car parking film clip, an audience would need figures on the following: (i) permit types and cost (daily, year, various zones) and the range of fines; (ii) average daily demand for car parking places v. available supply; (iii) student population: domestic v. international students; (iv) residential status: what percentage of students live on campus v. at home or in shared houses off campus.
3. Are the students expected to engage in activities while the material is being shown, or will follow-up activities be used instead? This could take the form of: (i) *think, pair, share* activities, where students discuss the question, prepare a written answer, then share it with their neighbour (Lyman, 1981; Lyman, 1987); (ii) lecturer/student-led classroom discussion; or (iii) homework assignments.
4. Will student learning outcomes be measured? If so, how?
5. How does this affect the amount of material covered in the course? It takes time to plan, set up and execute multimedia activities in the classroom and many lecturers are concerned that the opportunity cost of doing so is quite high, i.e. this time could be used to cover concepts in more depth and breadth. I would make three comments in response. First, if used effectively, technology actually allows a lecturer to cover more not less material. The car parking film clip cited in this paper could be used to teach concepts as diverse as: scarcity, opportunity cost, tradeoffs, thinking at the margin, externalities, market power, market failure, information asymmetry and the economics of crime. Second, lecturers should 'start small', that is, find a short film clip, song or newspaper source and introduce it into the class. Once you feel comfortable, slowly expand. Third, if the audiovisual clip is modelled briefly in class, then it can be set as a homework assignment. In this case, the material is a complement to traditional classroom teaching rather than a substitute.
6. Audiovisual materials can be used online (via the internet), downloaded and embedded into a PowerPoint presentation, run from a hard drive, USB stick or DVD. Knowing how to use equipment effectively and efficiently is important, as is knowing who to contact in an emergency!

I often use audiovisual clips as an 'ice breaker' at the beginning of the lecture. If I intend to assess the students directly, either in-class or as part of a group assignment or homework, I would initiate a general discussion to provide context. With respect to the car parking film clip, I would begin with the following questions: Who buys a car parking permit? Why? Does it offer value for money? Ever considered not paying? Have you ever had problems finding a spot? How do you react? Is this a problem for the university? If so, what should be done about it?

Then, I would tie this in with the economic concepts I wish to illustrate: (i) as a *think, pair, share* exercise, either during the clip or afterwards; or (ii) in a general class discussion. Students should be able to identify the concepts involved and to provide written/verbal examples from the material.

Once you have tested for general comprehension, you need to bring this back to the main theme of the film: is this a case of market failure? Depending on when you introduce this material in the subject, the definition of market failure might need to be explained, along with the three main causes: (i) externalities; (ii) asymmetric information; (iii) market power. I find that students can usually provide examples in lay terms, i.e. understand how it works in reality but are not aware of the theoretical underpinnings or concepts involved. If the audiovisual material requires a level of understanding more advanced than the material already covered in the course, I would be tempted to briefly explain the theory behind market failure before showing the clip to help students make the link between theory and reality. If the material is reinforcing concepts learned earlier in the subject or from a previous subject, this would not be necessary.

4. Relevance in a broader sense

Market failure is an important concept in economics, yet one often misunderstood by many students. The central issues are: (i) the market fails to allocate resources efficiently; (ii) there is no market solution: in this case the market is the problem. Ask students to consider whether the car parking problem is self-correcting (transitory)? Are they able to identify instances of market failure in society?

Another crucial issue is: what is the appropriate role of the government (or in this case, the university) in dealing with market failure? This could be tied in with broader debates among economists about the appropriate level of government intervention in the economy. *EconStories.tv* has recently brought John Maynard Keynes and Friedrich Hayek back to life in a series of raps which trace the debate between government intervention and market forces over the 20th century, up to and including the recent Global Financial Crisis: *Fear the Boom and Bust* and *Fight of the Century*.

5. Final remarks

The benefits of using multimedia in the classroom are well established in the academic literature but, as a discipline, economics has been slow to adopt innovative approaches to teaching (Becker, 2001; Becker, 2003; Becker and Watts, 1996; Becker and Watts, 2001). This paper demonstrates the practical benefits of using multimedia, in particular, a film clip produced by students, to bring the 'Dismal Science' to life. On a micro level, students can tap into their own lives, hobbies and grievances to find a practical application of economic theory and develop an intuitive understanding of the core economic principles which shape our understanding of human behaviour: thinking at the margin, rationality, tradeoffs and opportunity cost. On a macro level, the recent global financial crisis is a wakeup call to economists: when economics loses touch with the real world, it ceases to provide insights into the social, economic and political behaviour of everyday life. The once 'Dismal Science' reverts back to its pejorative.

Web resources

'Captain Economics', Economics Network student film competition

URL: http://www.youtube.com/watch?v=ftBs8LBO8is&feature=player_embedded [last accessed 14 May 2011]

Our mysterious masked hero has practical advice for all sorts of people, based on concepts from economics. He also has nice, clean underpants.

'Car Parking at La Trobe University: Is this a Case of Market Failure?'

URL: <http://www.youtube.com/watch?v=umUzJGnt8UM> [last accessed 16 May 2011]

Film clip produced by my students in October 2010.

'Economics of Poker', Dirk Mateer's Econ Channel

URL: <http://www.youtube.com/user/dmateer#p/f/28/V-t1V4WGcQQ> [last accessed 17 May 2011]

Two students discuss the application of playing poker to studying economics.

Ghent, L., Mateer, D.G. and Stone, M. 'TV for Economics'

URL: <http://tvforecon.blogspot.com/> [last accessed 15 April 2011]

This website has a list of clips from TV shows that can be used to emphasise applications of economic concepts.

Hall, J.C, Lawson, R.A. and Mateer, D.G. 'From Abba to Zeppelin, Led'

URL: http://www.divisionoflabour.com/music/author_archives/dirk_mateer/ [last accessed 18 April 2011]

This website provides lyrics and follow-up questions that can be used to learn economics.

Mateer, D.G. 'Teaching Economics with YouTube'

URL: <http://www.youtube.com/user/dmateer> [last accessed 15 May 2011]

This channel showcases two teaching methods: (i) A series of short in-class videos that utilise interactive learning approaches to teach principles of economics; (ii) Links to economic content provided by other YouTube users.

Mateer, D.G. 'Economics in the Movies'

URL: <http://economicsinthemovies.swlearning.com/> [last accessed 17 April 2011]

This website contains a database of film scenes that can be used to illustrate economic concepts.

'Mathematics for Economics: enhancing teaching and learning'

URL: <http://www.metalproject.co.uk/METAL/Resources/Films/index.html> [last accessed 19 April 2011]

This project provides lecturers and students with a selection of free learning resources designed to engage introductory level students more fully and enthusiastically in mathematics for economics.

Papola, J. and Roberts, R. 'EconStories.tv'

URL: <http://econstories.tv/> [last accessed 30 May 2011]

This website brings John Maynard Keynes and Friedrich Hayek back to life in a series of raps: 'Fear the boom and bust' and 'Fight of the century'.

Schunn, C. 'SWoRd: Scaffolded Writing and Reviewing in the Discipline'

URL: <http://www.lrdc.pitt.edu/schunn/sword/index.html> [last accessed 15 April 2011]

This is a web-based review system which offers guidance on the topics of effective writing assignments, optimal feedback on writing, and the power of peer feedback.

'TED: Ideas worth spreading'

URL: <http://www.ted.com/talks> [last accessed 15 April 2011]

TED-talks are short video lectures of 15-20 minutes length on a variety of topics.

'Why Study Economics?'

URL: <http://www.whystudyeconomics.ac.uk/> [last accessed 15 April 2011]

The Economics Network launched a student film competition in 2005-06. These videos are available on YouTube and most can be downloaded for offline use from this site.

References

- Becker, W. E. (2001). 'How to Make Economics the Sexy Social Science', *Chronicle of Higher Education*, 7 December, pp. B10–B11.
- Becker, W. E. (2003). 'Undergraduate Choice: Sexy or non-Sexy', *Southern Economic Journal*, Vol. 70(1), pp. 219–23.
- Becker, W. E. (2004). 'Economics for a Higher Education', *International Review of Economics Education*, Vol. 3(1), pp. 52–62.
- Becker, W.E. and Watts, M. (1996). 'Chalk and Talk: A National Survey of Teaching Undergraduate Economics', *American Economic Review: Papers and Proceedings*, Vol. 86, pp. 448–54.
- Becker, W.E. and Watts, M. (2001). 'Teaching Economics at the Start of the 21st Century: Still Chalk and Talk', *American Economic Review: Papers and Proceedings*, Vol. 91, pp. 446–51.
- Bransford, J., Brown, A. and Cocking, R. (2000). *How People Learn: Brain, Mind, Experience and School: Expanded Edition*, Washington, DC: National Academy Press.
- Cho, K., Schunn, C. D. and Wilson, R. (2006). 'Validity and reliability of scaffolded peer assessment of writing from instructor and student perspectives', *Journal of Educational Psychology*, Vol. 98(4), pp. 891–901.
- Cho, K. and Schunn, C. D. (2007). 'Scaffolded writing and rewriting in the discipline: A web-based reciprocal peer review system', *Computers and Education*, Vol. 48(3), pp. 409–26.
- Cowen, P. S. (1984). 'Film and Text: Order Effects in Recall and Social Inferences', *Educational Communication and Technology*, Vol. 32, pp. 131–44.
- Dixit, A. (2005). 'Restoring Fun to Game Theory', *Journal of Economic Education*, Vol. 36(3), pp. 205–19.
- Dixit, A. (2011). 'An Option Value Problem from Seinfeld', *Economic Inquiry* [forthcoming].
- Fryer, R., Goeree, J. and Holt, C. (2005). 'Experience-Based Discrimination: Classroom Games', *Journal of Economic Education*, Vol. 36(2), pp. 160–70.
- 'Generation Y drowning in debt', *The 7.30 Report*, 29 June 2010,
URL: <http://www.abc.net.au/7.30/content/2010/s2940421.htm> [last accessed 30/6/2010].
- Ghent, L., Mateer, D. G. and Stone, M. (2011). 'TV for Economics', *Journal of Economic Education*, Vol. 42(2), p. 207.

Hall, J. C. (2005). 'Homer Economicus: Using *The Simpsons* to Teach Economics', *Journal of Private Enterprise*, Vol. 30 (2), pp. 165–76.

Hall, J. C. and Lawson, R. A. (2008). 'Using Music to Teach Microeconomics', *Perspectives in Economic Education Research* Vol. 4(1), pp. 23–36.

Hall, J. C., Lawson, R. A. and Mateer, D. G. (2008). 'From ABBA to Zeppelin, Led: Using Music to Teach Economics', *Journal of Economic Education*, Vol. 39(1), p. 107.

Hall, J. C., Lawson, R. A., Mateer, D. G. and Rice, A. (2008). 'Teaching Private Enterprise Through Tunes: An Abecedarium of Music for Economists', *Journal of Private Enterprise*, Vol. 23(2), pp. 157–66.

Hansen, W. L., Salemi, M. K. and Siegfried, J. J. (2002). 'Promoting Economic Literacy in the Introductory Economics Course – Use It or Lose It: Teaching Literacy in the Economics Principles Course', *American Economic Review: Papers and Proceedings*, Vol. 92(2), pp. 473–77.

Houser, S. and Leet, D. (2003). 'Economics goes to Hollywood: Using Classic Films and Documentaries to Create an Undergraduate Economics Course', *Journal of Economic Education*, Vol. 34(4), pp. 326–32.

Lawson, R. A. (2006). 'Teaching Economics Principles with Comic Strips', *Journal of Private Enterprise*, Vol. 23(1), pp. 168–76.

Li, H. and Mateer, D. G. (2008). 'Movie Scenes for Economics', *Journal of Economic Education*, Vol. 39(3), p. 303.

Lyman, F. T. (1981). 'The responsive classroom discussion: The inclusion of all students', in A. Anderson (ed.), *Mainstreaming Digest*, College Park: University of Maryland Press, pp. 109–13.

Lyman, F.T. (1987). 'Think-Pair-Share: An expanding teaching technique' *MAA-CIE, Cooperative News*, vol. 1, pp. 1–2.

'Man drought hits Central Australia', *ABC News*, 14 July 2010,
URL: <http://www.abc.net.au/news/stories/2010/07/14/2953091.htm> [last accessed 16 July 2010].

Mateer, D. G. (2005). *Economics in the Movies*, Mason, OH: South-Western.

Mateer, D. G. and Rice, A. (2007). 'Using Flash to Create Synchronized Lyrics and Music to Teach Economics', *Perspectives on Economic Education Research*, Vol. 3(1), pp. 53–64.

Mateer, D. G. (2011). 'Using Media to Enhance Teaching and Learning', *Starting Point: Teaching and Learning Economics*,
URL: <http://serc.carleton.edu/econ/media/index.html> [last accessed 16 May 2011].

Poulter, M. (2010). 'Creative Commons', *Economics Network*,
URL: <http://www.economicsnetwork.ac.uk/themes/licensing.htm> [last accessed 16 May 2011].

Salomon, G. (1979). *Interaction of Media, Cognition and Learning: An Exploration of How Symbolic Forms Cultivate Mental Skills and Affect Knowledge Acquisition*, San Francisco: Jossey-Bass.

'The Handbook for Economics Lecturers', *Economics Network*,
URL: <http://www.economicsnetwork.ac.uk/handbook/web/33.htm> [last accessed 17 May 2011].

'\$26 boost to minimum wage', *ABC News*,

URL: <http://www.abc.net.au/news/stories/2010/06/03/2917094.htm> [last accessed 3 June 2010].

Willingham, D. T. (2009). *Why Don't Students Like School?*, San Francisco: Jossey-Bass.

Author's note

1. This paper arose from a case study developed during a period of stay at the Economics Network from April-June 2011. Special thanks to Inna Pomorina, John Sloman, Martin Poulter, Miriam Best, Ros O'Leary and Wyn Morgan for making me feel welcome and providing constructive feedback on earlier drafts.

2. The author would also like to thank the following for comments and feedback: David Addison, Gary Magee, Dirk Mateer and Michael Smiddy. Thanks also to Laura Moate for her excellent proofreading skills.

3. Finally, a big thank you to the following people whose creativity, hard work and talent should be acknowledged: Cameron Thomas, Maximilian Krahn, Neyat Sabedinovski and Volkan Kaman.

Contact details

Wayne Geerling
Pennsylvania State University,
Department of Economics,
306 Kern Building,
State College, PA 16801,
United States
Email: wag11@psu.edu