CHAPTER 8

Balancing the Needs of the Many Against the Needs of the Few: Aliens, Holograms and Discussions of Medical Ethics

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Healthcare educators need to prepare their students to become effective medical professionals, capable of utilising their own personal wisdom as well as several different ethical theories and codes of conduct in their practice. This involves providing training so that students can be professionally socialised and gain an understanding of appropriate ethical behaviour in their discipline.[1] However, medical ethics is a challenging concept to teach, as it is complex, cognitively demanding and often subjective. Pedagogic innovation can therefore be beneficial in creating learning opportunities that allow students to explore medical ethics and their own social and cultural biases in an experiential way.

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Throughout history science fiction has provided a literary vehicle to explore science, technology, philosophy and society's visions of the future. One of the largest science fiction phenomena to date is the *Star Trek* franchise. The first *Star Trek* television series (entitled *Star Trek*, now referred to as *Star Trek: The Original Series*) was aired between 1966 and 1969. In subsequent years, four additional television series were released: *Star Trek: The Next Generation* (1987–94), *Star Trek: Deep Space Nine* (1993–9), *Star Trek: Voyager* (1995–2001) and *Star Trek: Enterprise* (2001–5). Thirteen motion pictures have also been released (1979–2016).

Previous research has shown that complex social, moral or ethical problems can be approached in a more open-minded manner if they are presented in a fictional context. For example, Joyce Fields showed that the complex concept of sociological imagination (an awareness of the interrelated nature of one's personal experience and the wider society) could be taught in an introductory sociology subject using *Harry Potter*.[2] The *Star Trek* universe similarly provides an effective literary vehicle to examine ethical and moral questions associated with modern science and technology. A previous study showed that the *Star Trek: The Next Generation* episode *Ethics* could be used at a first-year level,[3] to teach students about medical ethics and the doctor–patient relationship.[4] The scripts of *Star Trek* are presented as modern philosophical parables.[4] An important feature of the vast *Star Trek* universe is that it contains hundreds of unknown species, each with their own cultures and beliefs.[4] It has been argued that within one series, or even within one episode, ethical philosophies can vary dramatically between individuals, creating an environment without a single overarching moral code.[4,5] This fictional setting therefore allows discussions that are free from traditional societal or cultural biases, since people are less likely to have a pre-conceived bias about an alien species compared with a particular human race or culture.[4,5] Furthermore, each episode is usually self-contained, so a detailed understanding of the franchise or the particular *Star Trek* series is not required for effective teaching.

Many episodes of *Star Trek* incorporate ethical dilemmas in healthcare and can therefore be useful teaching resources to introduce students to the concepts of medical ethics. In this chapter we will focus on two episodes from *Star Trek: Voyager*: *Nothing Human* (Season 5, Episode 8),[6] and *Critical Care* (Season 7, Episode 5).[7] We have chosen these episodes as they can be used in conjunction with each other to examine all

four of the key principles of medical ethics (respect for autonomy, non-maleficence, beneficence and justice).[8] Furthermore, both episodes are effective in highlighting a situation where the ship's doctor decides to compromise his own moral code in order to fully meet the needs of his patients. In the following sections we describe how each of these episodes can be used as an effective teaching strategy to evoke deeper learning and improve student engagement.

Exploring the Principles of Medical Ethics Using Star Trek

A key figure in the *Star Trek* universe is the Science Officer from *The Original Series*—a Vulcan commander named Spock. In *Star Trek*, Vulcans are known for their attempts to make decisions based only on logic, without interference from emotion.[9] One of the most well-known Vulcan ethical philosophies is the need to benefit the greatest number of individuals, even at the expense of sacrificing the interests or well-being of a few. This philosophy permeates the *Star Trek* universe and demonstrates a consequentialist morality. Consequentialism advocates for the greatest good for the greatest number and evaluates morality based on the consequences of an action.[8] In a very real sense this philosophy also permeates healthcare settings. For example, consequentialist ideals are relevant in hospital triage settings, where healthcare staff need to determine where their time and resources would be of greatest benefit to the largest number of patients. Furthermore, the treatment of individual patients also incorporates consequentialist considerations by highlighting that the greatest good is the action that best fulfils the preferences of the patient.[8] Students are therefore likely to face consequentialist considerations throughout their medical practice.

An effective way to introduce consequentialist considerations to new students is to consider the use of unethically obtained research to treat patients effectively. It is a common misconception among new students that they will not encounter this ethical concern in their practice. It is important to challenge this perception, however, as several medical breakthroughs, even relatively recently, were indeed developed as a result of unethically conducted research. Consider, for example, the HeLa cell line found in most laboratories worldwide. This immortal cell line was created from tissue obtained from a terminally ill patient named

Henrietta Lacks.[10,11] Importantly, this tissue was obtained without the knowledge or consent of the patient or her family, largely owing to racial and economic prejudice at the time.[10] HeLa cells are currently the most commonly used human cell line in scientific research and are used to study biochemical processes in healthy and diseased tissue.[11,12] These cells have been used to produce treatments for various medical conditions including polio, cancer, influenza, haemophilia and Parkinson's disease.[10,11] By 2013 it was estimated that over 70,000 scientific articles had been published based on the HeLa cell line.[12] It is therefore very likely that students will at some point in their future practice interact with a treatment discovered or developed using HeLa cells.

The *Star Trek*: Voyager episode *Nothing Human* examines issues surrounding the use of unethically obtained research.[6] In particular it focuses on the use of medical research obtained through wartime atrocities. The episode's exploration of this issue relates to all four key principles of medical ethics, making it a useful teaching resource, particularly at the beginning of ethical training for pre-service clinicians. There are also clear parallels in this episode to the unethical medical research conducted by Nazi doctors during the Second World War that involved murder, torture and several other atrocities.[13] This episode is therefore particularly useful in highlighting the relevance of this topic to modern medicine.

Experiential learning, which allows students to create meaning for themselves through self-discovery, involves four stages: concrete experience, reflective observation, abstract conceptualisation and active experimentation.[14] Experiential learning is most effective when it involves a reflective learning phase, a time of deeper learning where students represent their learning and a time for learning from feedback.[15] Consequently, we suggest that educators use the *Star Trek* episode as a pre-class activity, requiring students to watch the episode in its entirety before class. This will allow students to experience the story through individual exploration, helping them to evaluate and reflect on their own personal views.

In order to allow students to present their learning in a reflective manner, it is suggested that each learner completes a reflective journal after watching the episode. The benefits of reflective journaling have been well documented, particularly in encouraging students to reflect on their experiences.[16,17] Research has also shown that reflective practice allows

medical professionals to discover personal beliefs and attitudes, become more self-aware and ultimately improve their practice.[18–20] Furthermore, reflective practice allows the identification of educational needs, engaging professionals in the process of life-long learning.[20,21] We have previously described a template for reflection (based on Gary Rolfe's minimal model of reflective practice),[22] which allowed students to focus on their experiences rather than academic content.[23] We suggest a similar journal template should be used for this learning experience.

For students to gain genuine knowledge from the experience, educators also need to provide engaging activities during class time to build upon the pre-class activity. We have described some of these activities later in this chapter. These activities incorporate peer discussion and feedback, allowing students to contextualise the experience and apply it to their future practice.

Synopsis and Dramatis Personae of *Star Trek*: Voyager

Star Trek: Voyager is set in the twenty-fourth century and follows the adventures of the crew of the starship Voyager as they attempt to return home from the distant Delta Quadrant, where they were stranded during their inaugural mission.[24] The episodes described below are set in seasons five and seven of the series and include the following key characters: Captain Kathryn Janeway (Captain of Voyager), Commander Chakotay (First Officer), Lieutenant Commander Tuvok (Security/Tactical Officer), Lieutenant B'Elanna Torres (Chief Engineer), Lieutenant Tom Paris (Helmsman), Ensign Harry Kim (Operations Officer), the Emergency Medical Hologram known as the Doctor (Chief Medical Officer) and Seven of Nine (known colloquially as 'Seven,' Astrometrics Crewman).[24] Most of these crew members are human, with the exception of Lieutenant Commander Tuvok (Vulcan), Lieutenant Torres (Half Human/Half Klingon, a warrior race that primarily values honour),[25] and the Doctor (a computer program). Seven is human but was captured as a child by the Borg, a cybernetic life form with a collective consciousness that incorporates other species into its collective through cybernetic assimilation.[26] She was liberated from the Borg but still retains some cybernetic implants.

Star Trek: Voyager: *Nothing Human*

The crew of Voyager encounter a distress call from an injured alien life form and decide to provide assistance. While the Doctor attempts to diagnose and cure his alien patient, the injured life form attaches itself to the ship's Chief Engineer—Lieutenant Torres. As the Doctor tries to detach the life form, he realises that it has attached itself to Lieutenant Torres' vital organs and that removal would likely result in the death of both his patients.

In consideration of the Doctor's lack of expertise in exobiology, Captain Janeway asks Ensign Kim to create a holographic consultant to help treat Lieutenant Torres. The Doctor decides to base the hologram on a well-known expert in the field named Crell Moset. The Doctor and Moset quickly start working on a potential treatment and in the process develop a professional friendship. However, it is soon discovered that Moset derived his expertise from wartime atrocities during which he murdered hundreds in the pursuit of medical progress, including the family of one of the junior crew members of the ship (Ensign Tabor).

The ensign tells the Doctor how Moset killed his grandfather during radiation experiments, as well as blinding and burning others to investigate their healing and adaptation processes. The Doctor is initially sceptical, noting that Moset was responsible for curing an epidemic. The Ensign is unimpressed, noting that the cost of this cure was borne by the many others who had been the subjects of Moset's experiments. The Doctor continues to resist blaming Moset, pointing out that there are no entries about his activities in the Enterprise computer. Commander Chakotay points out that those using questionable practices do not often publicise their actions. Nevertheless, the Doctor remains doubtful; Moset now holds a prestigious position at a respected university.

Despite the fact that Moset appears to be Lieutenant Torres' only hope for a cure, she refuses to accept any further treatment based on his wartime research. The rest of the episode centres on whether it is appropriate to use Moset's expertise. Ultimately, Captain Janeway decides to overrule Lieutenant Torres' objections and allow the Doctor to use Moset's treatment. The Doctor and Moset proceed with the treatment and manage to separate the life form and Lieutenant Torres. Both patients survive and the life form is returned to other members of its species. After the procedure, however, Lieutenant Torres is very upset that she was treated against her wishes.

After consideration, the Doctor decides to delete Moset's program and all its unethically acquired knowledge from the ship's computer. In the last scene of the episode, the Doctor informs Moset of his decision. Their ensuing discussion highlights the complexities surrounding the use of unethically obtained research when a patient's life lies in the balance. As they talk, Moset is triumphant about their joint success in saving both patients. When the Doctor questions the source of that success, Moset's wartime research, Moset instead questions the Doctor's own willingness to use that same research when his patient's life hung in the balance. The conversation, rather than providing clear-cut judgement on the moral issues highlighted in the episode, challenges each viewer to reach their own conclusions.

Learning Activities

As noted above, it is necessary to supplement self-discovery learning experiences with classroom activities that provide students with a time to represent their learning and a time to learn from feedback. In order to achieve this, we suggest that class time following this pre-class activity can be broadly divided into three sections: reflections from the experience, contextualising the experience and applying the experience to future practice. Learning activities for each of these sections are described below. These activities will allow students to develop a basic and personal understanding of each of the key principles of medical ethics.

Reflections from the Experience

At the start of the class, students should be asked to identify the ethical or moral issues highlighted in the episode, using their reflective journals if required. In consideration of the established benefits of shared learning, we suggest that this activity would be best conducted in small groups of three to four students. Following small group discussion, a larger group discussion should be facilitated by the teacher to collect the reflections from each small group. This part of the class should be designed to allow students to categorise their identified issues into overarching ethical theme clusters. Through in-depth group discussion, this activity can be used to highlight all four key medical ethics principles.

Contextualising the Experience

The second part of the class should contextualise the learning experience. In order to achieve this, we suggest providing the following activity to students and allowing small group and larger group discussion.

> A central ethical principle in the *Star Trek* universe is the importance of balancing the needs of individuals against the requirements and rights of larger groups. However, in this episode, Captain Janeway decides to allow the Doctor to use the unethically obtained wartime research to cure his patient, despite the fact that many people suffered or died in the pursuit of this research. This can be considered as placing the needs of the few (the individual patient) over the needs of the many (the people who suffered or died in the wartime experiments). Do you think it is more important to prioritise the needs of the many, or is it more important to ensure that the needs of the individual patient are met? Why?

Applying the Experience to Future Practice

The final part of the class is designed to allow students to apply what they have learned to future clinical practice. In order to achieve this, students should be provided with the following small-group discussion prompt.

> In the *Star Trek* episode you watched, Moset claims that the Doctor's argument for terminating his holographic program, based on Moset's wartime research activities, is unjustified, because the Doctor was prepared to use the results of that research.
>
> Their conversation highlights the complexities of deciding whether to use unethically obtained research, particularly when a patient's life lies in the balance. In current clinical practice, healthcare professionals are also faced with deciding whether to use unethically obtained research.
>
> Consider the case of Henrietta Lacks we have provided. Do you think the actions of the doctor who first obtained the HeLa cells were justified? Despite now knowing how the HeLa cells were

obtained, scientific research still continues to use these cells. Is this justified? Why or why not?

Encouraging Deeper Learning Through the Establishment of a Learning Community

In order to encourage deeper learning, we recommend that a second learning experience using the *Star Trek*: Voyager episode *Critical Care* should be incorporated into students' medical ethics training.[7] This episode further explores the concepts of justice, beneficence and non-maleficence in clinical practice, with a particular focus on the just allocation of medical resources. Research has demonstrated that participation in a learning community increases student engagement.[27] We believe that allowing students to collectively bear witness to the experiences of the Doctor will foster the development of a learning community, so we recommend that this episode should be watched together in class.

Star Trek: Voyager*: Critical Care*

The Doctor's program is activated in what appears to be a medical facility by a man who wants to sell him to the hospital administrator (Chellick). Realising that he has been stolen from Voyager, the Doctor initially refuses to work for his kidnappers. However, when he is confronted with a large number of trauma victims, the Doctor decides that the patients' need for his help outweighs his moral objections.

As the Doctor starts treating the patients, he discovers that the hospital is poorly staffed and lacks basic equipment and medicine. Additionally, he finds that he is not able to treat his patients effectively because they have low 'TC' scores. Before the Doctor is able to discover what a TC is, however, the hospital administrator transfers him to Level Blue where he is told his services are most needed. The Doctor assumes that Level Blue is the critical care area, and Chellick agrees that it is the place where quality care is most required.

At this point we recommend the video should be paused and students asked to identify what they would expect to find in the Level Blue area. Following group discussion, the video should be resumed. The Doctor discovers that Level Blue is in fact a vastly better resourced section of the hospital with only a few patients, none of whom appear to need

critical care. He soon discovers that these patients are receiving preferential treatment because their TC is higher than other patients. When he investigates further, the Doctor discovers that TC is a treatment coefficient, a value assigned to each patient upon their arrival at the hospital by a computer program called the Allocator. The TC is determined by a person's current and projected future worth to society. As a result of this system, the Allocator assigns higher TCs to wealthy, famous or important members of society, while socially inferior patients are denied life-saving care. Chellick notes that the algorithm is necessary in order to balance the level of care provided with the hospital's available resources.

As the Doctor starts treating the patients in Level Blue, he discovers that they are prescribed medicine for non-life saving treatments that are designed to increase life expectancy. This includes using daily injections of the medicine desperately needed in the other area of the hospital. The Doctor is confronted with the injustice of this system, and decides to try and circumvent the established protocols to make the system less discriminatory. He steals medication from Level Blue and uses it to treat several patients on Level Red (where those with lower TC scores are treated). Unfortunately, the Doctor's actions are soon discovered, leading to many critically ill patients being discharged because they have exceeded their permitted allocation of treatment for the year. This means that all the patients the Doctor treated are likely to die.

The hospital administrator decides to restrict the Doctor to Level Blue and gives the Allocator the power to override the Doctor's program. The Doctor, however, enlists the help of a staff member from the other part of the hospital and returns to Level Red. When he is discovered, the administrator decides it is time to deactivate the Doctor's program, but is not able to do so before the Doctor injects the administrator with the same virus that has caused so much suffering on Level Red. Explaining the injection to a Level Red physician, the Doctor explains that he is experimenting with a new treatment to improve empathy—in Chellick's case by changing his role (and perspective) from hospital administrator to patient. The Doctor also tricks the Allocator into thinking the administrator's TC is lower than it should be, so he is denied access to the cure. The Doctor uses Chellick's desire for the medicine as leverage to provide the medication to all Level Red patients who need it. Their conversation highlights the different priorities of their roles: the Doctor is focussed on preserving life, while the administrator is more

concerned about the well-being of the wealthy patients who presumably fund the hospital.

When the Doctor is rescued by his shipmates, he partially regrets his actions and expresses a hope that his decision to threaten the administrator with death was caused by a malfunction in his system. After a diagnostic, however, the Doctor is informed that his ethical subroutines are working perfectly—he cannot use them to explain his actions. Seven of Nine, who ran the diagnostic, identifies that the Doctor's actions make perfect sense in Borg ideology; he put the well-being of the collective ahead of that of a specific individual. The Doctor notes that he is not happy with this comparison to the Borg (who are well known within the *Star Trek* universe for their focus on subsuming all individuals and species they meet into their collective—with or without consent).[26]

Learning Activities

A key threshold concept in medical ethics is the realisation that there is not always a right or wrong answer in clinical practice. Learning activities that evoke an understanding of this threshold concept will result in deeper learning. We propose that the following two activities will allow students to foster their own understanding of the complexities of medical ethics. First, the following discussion prompt can be used to stimulate classroom discussion about whether the Doctor acted ethically in this episode.

> The Doctor asks Seven to do a diagnostic of the ethical aspects of his program because he thinks it was a malfunction in his system that allowed him to poison the hospital administrator, acting against his imperative, as a Doctor, to do no harm. However, after the diagnostic the Doctor discovers there was no malfunction and that his ethical subroutines are in fact working perfectly. Are the Doctor's actions therefore justifiable? Why or why not?

Secondly, we recommend that this learning experience should be complemented by the following reflective activity to promote self-discovery and personal growth. Since this is likely to be a challenging task, we

recommend that students should be told that their reflections will remain private and that they will not be required to submit them after class.

1. In this episode the Doctor decides that the needs of the many terminally ill patients on Level Red are most important, so he reallocates medicine that was intended for Level Blue patients. Identify at least one ethical reason why this action can be justified and one reason why this action could be considered unethical.
2. When the Doctor's actions are discovered, all the patients he treated with the stolen medicine are sent home because they have exceeded their annual allotment of medication. It is likely all of these patients will die. Write a reflective journal entry, examining how you feel about the Doctor's actions. Do you think he made the right decision? Why or why not? What would you have done differently?

Conclusion

Educators can explore real-world ethical issues in the fictional universe of *Star Trek*. In this chapter we have demonstrated a strategy for teaching the key principles of medical ethics using two episodes from *Star Trek: Voyager*. A similar strategy can also be effective in many other disciplines in higher education, as the *Star Trek* universe addresses ethical and moral dilemmas in a variety of spheres including philosophy, anthropology, sociology, artificial intelligence, law and religion. We therefore suggest that *Star Trek* can be used as an interdisciplinary literary vehicle to encourage students to engage effectively with technical content in a fictional environment.

Notes

1. J. Summers, 'Theory of Healthcare Ethics,' in *Health Care Ethics: Critical Issues for the 21st Century*, 3rd ed., Eds. E.E. Morrison and B. Furlong (Burlington, MA: Jones & Bartlett Learning, 2014), 3–45.
2. J.W. Fields, 'Harry Potter, Benjamin Bloom, and the Sociological Imagination,' *International Journal of Teaching and Learning in Higher Education* 19, no. 2 (2007): 167–77.

3. C. Chalmers, 'Ethics,' *Star Trek*: *The Next Generation*, Season 5, Episode 16, Screened 29 February 1992 (United States of America: Paramount Pictures, 1992).
4. J.J. Hughes, and J.D. Lantos, 'Medical Ethics through the Star Trek Lens,' *Literature and Medicine* 20, no. 1 (2001): 26–38.
5. J.A. Barad, *The Ethics of Star Trek* (New York: Perennial, 2001).
6. D. Livingston, 'Nothing Human,' *Star Trek*: *Voyager*, Season 5, Episode 8, screened 2 December 1998 (United States of America: United Paramount Network, 1998). Television Broadcast.
7. T. Windell, 'Critical Care,' *Star Trek*: *Voyager*, Season 7, Episode 5, screened 1 November 2000 (United States of America: United Paramount Network, 2000). Television Broadcast.
8. T.L. Beauchamp and J.F. Childress, *Principles of Biomedical Ethics*, 7th ed. (New York: Oxford University Press, 2012).
9. 'Vulcans,' *Star Trek Database*, accessed 28 June 2016, available at: http://www.startrek.com/database_article/vulcans.
10. R. Skloot, *The Immortal Life of Henrietta Lacks* (Sydney: Pan Macmillan, 2010).
11. J.R. Masters, 'Hela Cells 50 Years On: The Good, the Bad and the Ugly,' *Nature Reviews Cancer* 2, no. 4 (2002): 315–19.
12. J.J.M. Landry, P.T. Pyl, T. Rausch, T. Zichner, M.M. Tekkedil, A.M. Stütz et al. 'The Genomic and Transcriptomic Landscape of a Hela Cell Line,' *G3: Genes|Genomes|Genetics* 3, no. 8 (2013): 1213–24.
13. The Nuremberg Trials Project. *Medical Case Transcript*, Harvard Law School Library Digital Document Collection, available at: http://nuremberg.law.harvard.edu/.
14. D.A. Kolb, *Experiential Learning: Experience as the Source of Learning and Development* (Englewood Cliffs, NJ: Prentice Hall, 1984).
15. J. Moon, *A Handbook of Reflective and Experiential Learning: Theory and Practice* (London: Routledge Falmer, 2004).
16. S. Epp, 'The Value of Reflective Journaling in Undergraduate Nursing Education: A Literature Review,' *International Journal of Nursing Studies* 45, no. 9 (2008): 1379–88.
17. D.D. Stevens and J.E. Cooper, *Journal Keeping: How to Use Reflective Writing for Learning, Teaching, Professional Insight, and Positive Change* (Sterling, VA: Stylus, 2009).
18. A. Bandura, *Social Foundations of Thought and Action: A Social Cognitive Theory* (Englewood Cliffs, NJ: Prentice Hall, 1986).
19. R.M. Epstein, 'Mindful Practice,' *Journal of the American Medical Association* 282, no. 9 (1999): 833–9.
20. K. Mann, J. Gordon, and A. MacLeod, 'Reflection and Reflective Practice in Health Professions Education: A Systematic Review,' *Advances*

in Health Sciences Education: Theory and Practice 14, no. 4 (2009): 595–621.
21. D. Boud, R. Keogh and D. Walker, *Reflection: Turning Experience into Learning* (London: Kogan Page, 1985).
22. G. Rolfe, D. Freshwater and M. Jasper, *Critical Reflection for Nursing and the Helping Professions: A User's Guide* (Basingstoke: Palgrave Macmillan, 2001).
23. L. Pretorius and A. Ford, 'Reflection for Learning: Teaching Reflective Practice at the Beginning of University Study,' *International Journal of Teaching and Learning in Higher Education* 28, no. 2 (2016): 241–52.
24. Star Trek: Voyager,' Star Trek Database, accessed 28 June 2016, available at: http://www.startrek.com/page/star-trek-voyager.
25. 'Klingons,' Star Trek Database, accessed 28 June 2016, available at: http://www.startrek.com/database_article/klingons.
26. 'Borg,' Star Trek Database, accessed 28 June 2016, available at: http://www.startrek.com/database_article/borg.
27. L.M. Rocconi, 'The Impact of Learning Communities on First Year Students' Growth and Development in College,' *Research in Higher Education* 52, no. 2 (2011): 178–93.

Acknowledgements *Star Trek* is a trademark of CBS Studios Inc.

Bibliography

Bandura, A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall, 1986.

Barad, J.A. *The Ethics of Star Trek*. New York: Perennial, 2001.

Beauchamp, T.L. and J.F. Childress. *Principles of Biomedical Ethics*, 7th ed. New York: Oxford University Press, 2012.

Boud, D., R. Keogh and D. Walker. *Reflection: Turning Experience into Learning*, London: Kogan Page, 1985.

Chalmers, C. 'Ethics,' *Star Trek: The Next Generation*, Season 5, Episode 16, Screened 29 February 1992. United States of America: Paramount Pictures, 1992.

Epp, S. 'The Value of Reflective Journaling in Undergraduate Nursing Education: A Literature Review.' *International Journal of Nursing Studies* 45, no. 9 (2008): 1379–88.

Epstein, R.M. 'Mindful Practice.' *Journal of the Medical Association* 282, no. 9 (1999): 833–9.

Fields, J.W. 'Harry Potter, Benjamin Bloom, and the Sociological Imagination.' *International Journal of Teaching and Learning in Higher Education* 19, no. 2 (2007): 167–77.

Hughes, J.J. and J.D. Lantos. 'Medical Ethics through the Lens.' *Literature and Medicine* 20, no. 1 (2001): 26–38.

Kolb, D.A. *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, NJ: Prentice Hall, 1984.

Landry, J.J.M., P.T. Pyl, T. Rausch, T. Zichner, M.M. Tekkedil, A.M. Stütz et al. 'The Genomic and Transcriptomic Landscape of a Hela Cell Line.' *G3: Genes|Genomes|Genetics* 3, no. 8 (2013): 1213–24.

Livingston, D. 'Nothing Human,' *Star Trek: Voyager*, Season 5, Episode 8, screened 2 December 1998. United States of America: United Paramount Network, 1998.

Mann, K., J. Gordon and A. MacLeod. 'Reflection and Reflective Practice in Health Professions Education: A Systematic Review.' *Advances in Health Sciences Education: Theory and Practice* 14, no. 4 (2009): 595–621.

Masters, J.R. 'Hela Cells 50 Years On: The Good, the Bad and the Ugly.' *Nature Reviews Cancer* 2, no. 4 (2002): 315–19.

Meyer, N. *Star Trek II: The Wrath of Khan*, screened 4 June 1982. United States of America: Paramount Pictures, 1982.

Moon, J. *A Handbook of Reflective and Experiential Learning: Theory and Practice*. London: Routledge Falmer, 2004.

Morrison, E.E. and B. Furlong, . eds. *Health Care Ethics: Critical Issues for the 21st Century*, 3rd ed. Burlington, MA: Jones & Bartlett Learning, 2014.

Pretorius, L. and A. Ford. 'Reflection for Learning: Teaching Reflective Practice at the Beginning of University Study.' *International Journal of Teaching and Learning in Higher Education* 28, no. 2 (2016): 241–53.

Rocconi, L.M. 'The Impact of Learning Communities on First Year Students' Growth and Development in College.' *Research in Higher Education*, 52, no. 2 (2011): 178–93.

Rolfe, G., D. Freshwater and M. Jasper. *Critical Reflection for Nursing and the Helping Professions: A User's Guide*. Basingstoke: Palgrave Macmillan, 2001.

Skloot, R. *The Immortal Life of Henrietta Lacks*. Sydney: Pan Macmillan, 2010.

Star Trek Database. Accessed 28 June 2016, available at: http://www.startrek.com/database.

Stevens, D.D., and J.E. Cooper. *Journal Keeping: How to Use Reflective Writing for Learning, Teaching, Professional Insight, and Positive Change*. Sterling, VA: Stylus, 2009.

The Nuremberg Trials Project. *Medical Case Transcript*, Harvard Law School Library Digital Document Collection, available at: http://nuremberg.law.harvard.edu/.

Windell, T. 'Critical Care,' *Star Trek: Voyager*, Season 7, Episode 5, screened 1 November 2000. United States of America: United Paramount Network, 2000.