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MANGA, GRAPHIC NOVELS, AND COMICS IN HIGHER EDUCATION?

Particularly known for playing a key role in the daily entertainment of millions of people worldwide, this article explores the relevance of manga, graphic novels, and comics to diversify curricula and making learning more engaging, and explores why this is of value for Higher Education.
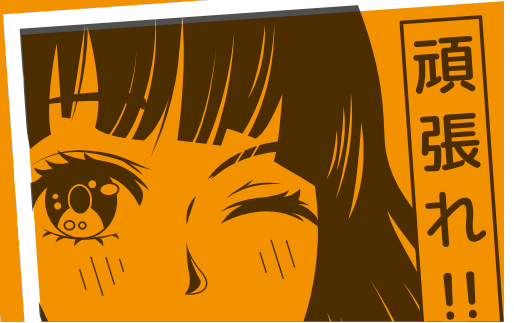
Manga and graphic novels

The origin of manga, like that of cartoons or graphic novels, is debated and links and similarities have been drawn with predating popular arts or cultures. Manga, like comics, may have emerged as an amalgam of indigenous cultural and graphic narrations, and global influences, but became a uniquely recognisable product and major part of the Japanese publishing industry after WWII. In Japan the manga industry matured alongside the baby boomers, initially focusing on stories and developing themes to fascinate children. As this generation became adults, the manga industry evolved and diversified - where it continued to captivate readers of all ages through a proliferation of genres, topics, and themes, while shedding the prejudgement towards its artistic quality as a mass product (Johnson-Woods, 2010). Similar observations have been made within the European and American context. Arguably, since the turn of the millennium, graphic novels, and comic books have become re-valued by detaching them from moral panics and fears of deteriorating reading abilities. Classics such as *The Adventures of Tintin* by Hergé have become re-appreciated, and new titles become acclaimed for more complex and sophisticated story lines (c.f. MacWilliams, 2008; Babic, 2014).

Manga in particular, plays a significant part in the daily entertainment of millions of Japanese and South Koreans, and translated volumes have become mainstream among children, teens, tweens, and adults in Italy, France, Germany, Spain, North America, and the UK (c.f. Johnson-Woods, 2010). Like other narrative art forms, manga and graphic novels use a variety of practices, styles, and genres to transpose a story line, create suspense and captivate the reader (Johnson-Woods, 2010). Besides entertaining, manga narratives are often written against a more serious background, and the protagonist might for instance explore and discuss romance, sexuality and gender, and raise philosophical questions about identity, intersectionality or their social economic situation (e.g. *Princess Jellyfish* by Akiko Higashimura, or *Ghost in the Shell* by Masamune Shirow); describe careers in corporate cultures (e.g. *Kosaku Shima* by Kenshi Hirokane); investigate and contextualise politics, power, inequality and war (e.g. *Barefoot Gen* by Keiji Nakazawa), or grapple with rapid societal, economical, technological and environmental change (e.g. *Nausicaä of the Valley of the Wind* by Hayao Miyazaki).

M anga is the name given to comics or graphic novels that originate from Japan. They express a narrative through illustrations, in a sequence of one or more panels, in a non- or semi-realistic style, sometimes in combination with text. The narrative in comics is usually short, light-hearted, and humorous, or satirical in the case of a caricature. As a gross simplification, manga, graphic novels, and comics have for a long time been perceived as primarily for children, while newspaper caricatures have a standing tradition in politics and opinion making, but their main function is to entertain. However, information manga and cartoons are used and designed for the educational setting long before World War II (WWII) (c.f. Friesen, 2013; Humphrey, 2014). This article explores how manga, graphic novels, and cartoons have become relevant for Higher Education (HE) to illustrate, inform, and provoke further thinking.

Manga and graphic novels in education

Because of their popularity, manga and graphic novels have found their way into primary and secondary education and are gaining recognition in academic libraries. Many manga and graphic novels cover topics that are relevant to sociology or history and are written for a mature audience. *Buddha* by Osamu Tezuka or *The 14th Dalai Lama: A Manga Biography* by Tetsu Saiwai are examples of biographies. While, Jacques Tardi's *It Was The War Of The Trenches*, is a series of stories illustrating the horrors of WWI, and *A Jew in Communist Prague* by Vittorio Giardino's explores discrimination and oppression under Stalin. These and many other titles intersect journalism and history, vividly illustrating what it is like to live in different parts of the world, and convey the impact of politics and displacement in ways that other forms of media might not. Other graphic novels explore issues arising from urbanisation, gender, homophobia and identity. Building on the benefits of the medium's multimodality, many American academic libraries have a catalogue of manga and graphic novels to support students' literacy, comprehension, and language development, such as the *Manga Shakespeare* series (c.f. Burger, 2018).

Educational manga and graphic novels are specifically written to inform and educate. Like non-fictional literature, scientific topics, discoveries, historic events and famous scientists are set out in a graphic format and made accessible for a wider audience through a growing catalogue of titles (see Table 1). For instance, Jim Ottaviani has written a number of graphical biographies of physicists and mathematicians like *Niels Bohr* or *Alan Turing*, and paid tribute to female scientists in *Dignifying Science: Stories About Women Scientists*. Others have developed works on specific topics, such as *Evolution* by Jay Hosler, which explores the evolution of life on earth in a graphical and humoristic format. Two other examples that indicate range as well as the intellectual and educational quality are *Logicomix: An Epic Search for Truth* by Apostolos Doxiadis and Christos Papadimitriou, and *Economix: How and Why Our Economy Works (and Doesn't Work)* by Michael Goodwin. Further examples in Table 1 signify the growing opportunities to engage with often complex subjects and fascinating developments, discoveries and individuals in a graphic format, thereby stimulating science literacy among all ages.

Similar to developments in Japan, manga and cartoon drawing have found their way into arts education in America. Building on their popularity, manga have come to play a role in developing students' artistic expression, storytelling and creative writing, and by this means stimulated an interest

in arts and graphic design more broadly. As such, manga and graphic novels are considered to play a crucial role in outreach, raising academic aspirations and helping to create a more inclusive and diverse classroom. They stimulate students reading, writing and drawing for pleasure, broaden horizons and encourage an interest in other cultures. Thereby creating opportunities to question students' preconceptions and develop their critical thinking (c.f. Burger, 2018; O'English *et al.*, 2006).

Use of manga, graphic novels and cartoons in Higher Education

The relevance of manga, graphic novels and cartoons for HE is emerging. A growing number of peer-reviewed articles across the disciplines report that activities involving manga, graphic novels, and cartoons stimulate engagement and enjoyment in learning, help students to memorise and clarify key concepts, and stimulate critical thinking. Moreover, manga, graphic novels and cartoon activities have been used to develop professionalism and professional values in, for instance, medical and business education. Table 2 provides an annotated overview of a selection of articles, outlining the disciplinary scope and application of manga activities in HE. The sections below explore activities that can be adopted with relative ease, and discuss why HE students might learn to understand the value of manga, graphic novels and cartoons considering their future professional roles.

Author	Year	Title	Subject
Bargiela, S.	2019	Camouflage: The Hidden Lives of Autistic Women	Psychology
Caplan, B.	2019	Open Borders: The Science and Ethics of Immigration	Sociology
Damour, T. & Burniat, M.	2017	Mysteries of the Quantum Universe	Physics
Farinella, M.	2017	The Senses	Neuroscience
Farinella, M. & Roš, H.	2013	Neurocomic	Neuroscience
Fetter-Vorm, J.	2013	Trinity (history of the first atomic bomb)	History, Physics
Hossler, J.	2007	Optical Allusions	Biology
Ottaviani, J.	2015	Primates (Primatologists: Jane Goodall, Dian Fossey, and Birute Galdikas)	Biology
Ottaviani, J.	20	T-Minus: The Race to the Moon Paperback	History, Space race
Padua, S.	2016	The Thrilling Adventures of Lovelace and Babbage: The (Mostly) True Story of the First Computer	Maths, Computer sciences
Papadatos, A., Kawa, A. & Di Donna, A.	2015	Democracy	Sociology
Wulf, A. & Melcher, L.	2019	The Adventures of Alexander von Humboldt	Natural science

TABLE 1 Selection of graphic novels exploring scientific topics

Educational manga and graphic novels are specifically written to inform and educate. Like non-fictional literature, scientific topics, discoveries, historic events and famous scientists are set out in a graphic format and made accessible for a wider audience through a growing catalogue of titles

Authors	Year	Article	Subject /Discipline	Use in education
Hosler, J. & Boomer, K.B.	2007	Are Comic Books an Effective Way to Engage Nonmajors in Learning and Appreciating Science?	Biology	Scaffolding biological themes about vision and evolution using comic book stories.
Nagata, R.	1999	Learning biochemistry through manga: helping students learn and remember, and making lectures more exciting	Biochemistry	Manga to assist students in understanding biochemistry lectures.
Kumasaki, M., Shoji, T., Wu, T.C., Soontarapa, K., Arai, M., Mizutani, T., Okada, K., Shimizu, Y. & Sugano, Y.	2018	Presenting safety topics using a graphic novel, manga, to effectively teach chemical safety to students in Japan, Taiwan, and Thailand	Chemistry	Lecturing chemical safety topics using manga narratives.
Gerde, V.W. & Foster, R.S.	2008	X-Men ethics: Using comic books to teach business ethics	Business	Using comic books to communicate, discuss, and critique business and social ethics.
Jenyk, S. & Wakefield, D	2018	Guns, Butter, and Dr. Seuss: Using Political Cartoons to Teach the PPC	Business	Using political cartoons to introduce and illustrate the production possibilities curve.
Mills, A.J., Robson, K. & Pitt, L.F.,	2013	Using cartoons to teach corporate social responsibility: A class exercise.	Business	In-class group exercise to analyse and discuss public sentiment related to corporate responsibility in political cartoons.
Green, M.J.	2015	Comics and Medicine: Peering Into the Process of Professional Identity Formation	Medical education	Creating a comic to improve students' competencies, attitudes and stimulate professional identity formation.
Kim, J., Chung, M.S., Jang, H.G. & Chung, B.S.	2017	The use of educational comics in learning anatomy among multiple student groups	Anatomy	To enhance students' interest and comprehension of basic anatomy through comics.
Vietz, K. & Grinnell, S.	2004	Does pathophysiology have to be boring?	Nursing education	Student designed posters and humorous storylines to teach Pathophysiology
Tanaka, Y., Iida, H. & Takemura, Y.	2018	A Manga-Driven System Requirements Development PBL Exercise	Engineering, software development	Problem based learning exercise drawing manga to improve communication in Requirements Development.
Giese, R.W.	2020	Connecting Current Literature, Cartoons, and Creativity: Incorporating Student-Created Cartoons in a Biochemistry Course to Enhance Learning	Pharmacy, Biochemistry	Creating and sharing summary cartoons to strengthen students' learning of pharmaceutical topics
Fradkin, C.	2018	The use of cartoon illustration for the assessment of social science concepts	Social science	Cartoons as an alternative assessment to evaluate students' conceptual knowledge of social theories.
Toledo, A., Yangco, T., & Espinosa, A.	2013	Media cartoons: effects on concept understanding in environmental education	Geography	Use of media and political cartoons to developed conceptual understanding of environmental issue
Rodrigues, A.I.	2018	The use of visual methods in tourism classes: The case of photo essay, cartoons and videography	Hospitality	In-class activity whereby students analyse contributions from the International Tourism Cartoon Competition to stimulate reflection on the societal impact and contextualise tourism worldwide.
Dougherty, B.K.	2002	Comic Relief: Using Political Cartoons in the Classroom	Social sciences	Description and guidance on how to use political cartoons in the social classroom to stimulate debate and critical thinking.

TABLE 2 Selection of articles using manga, cartoon, and graphic novels in HE

Many cartoonists and academics have started to share creative reflections on their work in cartoons or animations

Diversifying reading lists

Manga and graphic novels, like non-fiction and documentaries, explore professionally relevant topics from a personal perspective, bringing to life the psychological, social and financial implications that might be difficult to mediate in the classroom. Various titles carry relevance for disciplines like nursing, social work and psychology; for instance, Ernest, in *Wrinkles* by Paco Roca, looks at Alzheimer's and the transition into a nursing home, while the protagonist in *Epileptic* by David B describes his brother's battle with epilepsy. *In A Silent Voice* by Yoshitoki Oima, the trajectory of a group of maturing youngsters is played out, whereby the drama unfolds the psychological and social implications of living with disabilities and bullying. Other series, such as the science fiction manga *Planets* by Makoto Yukimura, explore the implications of corporate responsibilities, engineering, and technological dependences and political inequalities as a background against which the protagonists struggle with their own insecurities and ambitions. As such, each good reading list might benefit from a curated extracurricular section of literature, films and graphic novels.
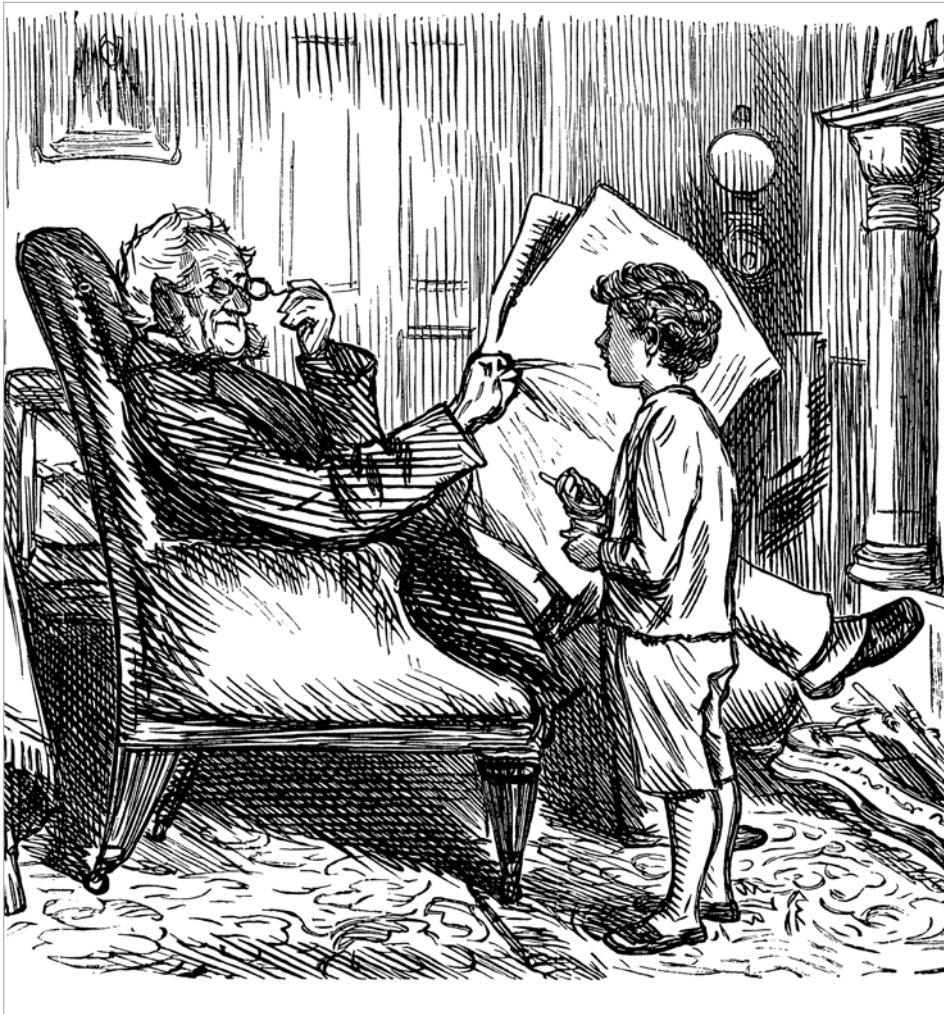
Many titles discussed above and presented in Table 1 will not cover scientific topics in considerable depth, still information- or textbook-manga has been specifically written for mature learners to stimulate interest and advance their science literacies. The publication of book-length educational manga in Japan and elsewhere dates back to the 1980s (c.f. MacWilliams, 2008). Through, for instance, visual metaphors and relatable character-driven narratives, information manga have the potential to make scientific information and topics more engaging and accessible to a wider audience. A classic graphic novel example is *The Cartoon Guide to Statistics* by Larry Gonick and Woollcott Smith. *The Manga Guides* is a series of educational manga, written by different authors, which explores a particular subject by combining normal textbook sections with manga storylines to bring the topics to life, and explore real world problems. Although the gender stereotypical roles need to be considered with care, the titles include, for instance: biochemistry, statistics, databases, cryptography and physiology. Another series worth pointing students' attention towards is *Introducing ... A Graphic Guide*. This extensive series of information manga has a wide range of titles on topics and thinkers including mathematics, natural sciences, philosophy and media theory. The series publishing history has roots in a cooperative and socialist mission to make subjects and the thinking of influential individuals available in an accessible way for an adult readership (c.f. O'English *et al.*, 2006). Although its titles will not suffice on their own, they are a great source to expand students' horizons, and signpost how professional knowledge can be mediated to a wider audience.

Cartoon hook

An important aspect of any lecture or session is the induction, according to Madeline Hunter, who developed the seven-stage lesson plan. The induction is the first stage of engaging students within the classroom and aims to raise anticipation, grab their attention, and put them in the right frame of mind. For this reason, the induction is often called the 'hook' (Schroth and Helfer, 2015). Starting a session with humour will help to draw students in, reduce intellectual resistance, and help alleviate any uncomfortable feelings. Hooking students into the session can be done in many ways, and commonly used strategies include introducing real world examples, case studies, metaphors, and debate, to problematise or raise the importance of the topic. Carefully selected manga, graphic novels and cartoons may be the perfect catalyst for this type of activity.

Many cartoonists and academics have started to share creative reflections on their work in cartoons or animations. They have stimulated an exchange of new ways of communicating theoretical and practical knowledge, while others engage directly with scientific and professional topics, stretching scientific reasoning, life experiences and other existential trivia in bar- and Venn diagrams that can help to hook students in on occasion. For instance, Rosemary Mosco's *Birding is my favorite video game* is a collection of comics illustrating zoological and biological sciences in a gentle and adorable way while carrying an environmental message. Taking scientific facts, interdisciplinarity and timelines not too seriously, the *NewScientist* cartoons by Tom Gauld collected in the *Department of Mind-Blowing Theories* or @twisteddoodles offer ample examples to reflect on the realities and misconceptions behind academia, discovery, and research methods. The webcomic *XKCD* by Randall Munroe, offers plenty of geek humour to introduce a discussion on mathematics, programming and natural science topics.

FIGURE 1 Concept- or summary-cartoon worksheet

Concept cartoons dialogues

Developed for primary and secondary education, concept cartoons usually consist of a few characters who in an everyday situation have a dialogue to discuss and raise questions about a natural phenomenon, concept or idea. These are different from newspaper cartoons in that they are not made to entertain but, rather, stimulate an inquiry into students' understanding and challenge misconceptions. Concept cartoons are used for a variety of educational purposes; besides keeping readers motivated to read and expand their vocabulary, they support the development of thinking and the recognition of misconceptions and problem solving, and make scientific ideas more accessible and tangible (Naylor & Keogh, 2013). These concept cartoons are teacher-centred and usually designed and drawn professionally. Within HE, integrating activities that stimulate conceptual clarification is a key aspect of active learning. Many subjects require the understanding and clarification of counterintuitive knowledge. Rephrasing or summarising these concepts in students' own words is an essential learning activity that cements their understanding. In a student made summary or concept cartoon students are asked to develop their own cartoon dialogue, in which they explain, or develop a misunderstanding of a key concept, formula, piece of coding or schematic representation. To lower the barrier for engagement a worksheet with different single panels containing various characters and blank speech bubbles can be provided, which students can sequence themselves to create a striking dialogue (see Figure 1). Developing a concept or summary cartoon either individually or as a cooperative-learning activity is less dry than the commonly used one-minute paper or muddiest point activity, and variations on this activity have been used in different subjects to strengthen students' understanding, or as an alternative assessment strategy (see Table 2).

Besides highlighting the latest political intrigues and drama, editorial cartoons depict and interpret the political thinking around many topics like global warming, air pollution, housing, transport, technology, infrastructure, social welfare and health

Analysing editorial cartoons

Editorial or newspaper cartoons are another excellent source for a cartoon hook that brings the currency of many topics to the attention of students. Besides highlighting the latest political intrigues and drama, editorial cartoons depict and interpret the political thinking around many topics like global warming, air pollution, housing, transport, technology, infrastructure, social welfare and health. Taking a few minutes to analyse and discuss political cartoons, either collectively or as a think-pair-share activity, not only introduces the topic, but the creative illustration also helps to develop critical and analytical skills, deepen students' understanding of the public perception, and the civic impact of their discipline or profession (see Table 2). A variation to develop students' own positionality and reflection could include an individual or small group activity in which students complete a blank version of the newspaper cartoon and come up with their own satirical headline or comical dialogue. Facilitated with a short presentation and ranking of that which is the most humorous, satirical, entertaining, or relevant to the session topic will additionally stimulate engagement and contribute to students' sense of belonging.

Science cartoons and humoristic infographics

Visual narratives and metaphors are essential to science education and communication. An example of communicating scientific findings in a graphic form is the SRHE funded research by Vigurs *et al*., (2016) *Higher Fees, Higher Debts*, which is not only an academic and artistic contribution but aims to stimulate public engagement with a wider audience, in this case HE students. Another is Farinella's (2018b) graphic paper *Of Microscopes and Metaphors: Visual Analogy as a Scientific Tool*, exploring the importance of analogies, metaphors, and conceptual frameworks as a key component of scientific thinking.

Considering the professional destination of many of our students, who will be working in professional roles that require public engagement, communicating and mediating often complex information, principles or guidelines. Being familiar and able to communicate through a variety of formats will be essential to reach out to diverse non-specialist groups and communities (c.f. Farinella, 2018a). Student led presentations are an established active learning activity, as they stimulate engagement, motivation, and self-efficacy, and the development of essential employability skills such as planning, peer-feedback and collaboration. Alternatives to a standard presentation are student-led humoristic- infographics and posters (see Table 2). In the public sector and on social media, information cartoons, infographics and animations are ubiquitous, and a good start would be the WHO infographics to get inspiration. The poster format requires students to summarise concisely and highlight what is essential, both of which are crucial academic skills, and the humoristic narrative allows students to express their topic creatively. Moreover, humoristic infographics stimulate students to reflect on their professional role to mediate complex information and experience the benefits and boundaries of different formats in terms of public engagement. As with concept cartoons, infographics are developed products and upon completion can be presented, with students' permission, within institutional corridors, at faculty away days, at research conferences, and during outreach activities and professional networking events, enabling a wider reach of the outcomes and creating a sense of community.

Conclusion

This brief overview has shown the relevance of manga, graphic novels and cartoons to the HE context, and Table 2 contains many more examples. The basic premise of manga, graphic novels and cartoons is to entertain, but humour is a matter of taste. Taste, as the sociologist Pierre Bourdieu argues, is a matter of preference and distinction. As such care needs to be taken with the assumption that cartoons will be experienced as playful and their intellectual, social, historic, or political context will be immediately understood when brought into the learning environment. However, as shown, the relevance of manga, graphic novels, and cartoons for HE has developed well beyond entertainment. The examples in Table 1 showcase how scientific knowledge can be mediated to a range of stakeholders including patients, clients, and customers, which is an important skill for any HE professional. There is considerable scope for further work, and the activities presented in this article are suggestions how manga, graphic novels and cartoons could be used for teaching and supporting learning in HE. As such we should look forward to further collaborations, scholarship and research exploring the pedagogical opportunities of information manga, cartoon hooks, concept- and summary-cartoons and humoristic infographics to make teaching and learning in HE more engaging, varied, and inclusive.

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