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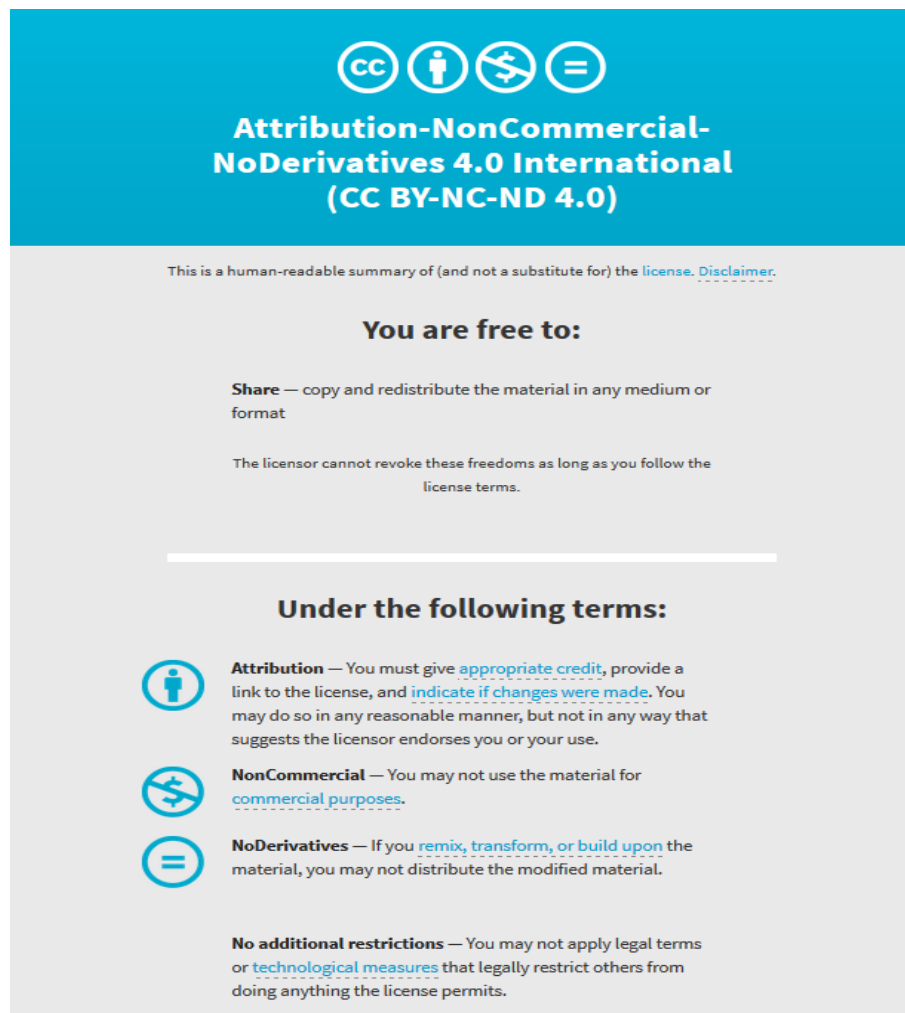
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Graphic medicine and health professional education: An internship comic book case study

A. Humphrey

Abstract

Introduction: This study aimed to determine whether comics in medical education (“graphic medicine”) can enhance professional identity formation (PIF) of junior doctors. This was accomplished through a multi-year trial of an internship comic book handbook that was specially designed to be used as part of an internship orientation program at Mackay Base Hospital.

Methods: A 24-page comic was distributed during the hospital’s intern orientation in 2014–2017. Surveys were conducted with 2014–2017 interns ($n = 54$) to assess how prepared they felt to meet the challenges of internship and how helpful they had found several orientation publications, with surveys of the 2013 interns providing control data ($n = 13$). Qualitative interviews from the 2014 cohort ($n = 9$) were analysed thematically and matched to groups of thematically similar survey responses.

Results: Interns reported feeling more prepared to face the challenges of internship following the introduction of the comic in 2014, compared to the 2013 control group, and this remained generally consistent throughout 2015, 2016 and 2017. At the end of internship, 92% of interns recalled the comic ($n = 47$) and 89% rated it as at least somewhat helpful ($n = 42$). The interviews and surveys were thematically grouped by the interns’ responses to the comic: resistant ($n = 8$), ambivalent ($n = 9$), ecumenical ($n = 23$) and enthusiastic ($n = 7$). A single variable linear regression analysis showed a statistically significant ($p = 0.04$) and mildly positive ($r = 0.29$) correlation between how helpful the interns found the comic and how well they felt they had been prepared for the challenges of internship. The comic was the only publication significantly correlated with preparedness ($p < 0.05$).

Conclusions: Comics can be a useful tool for medical education. Further use of comics in internship programs could improve how prepared interns are for the challenges of internship and, therefore, enhance their PIF.

Keywords: personal identity formation; internship; medical education; graphic medicine

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Introduction

There has been an increasing use of comics and graphic narratives for medical education over the past decade, a field which has become known as graphic medicine (Czerwiec et al., 2015; Glazer, 2015; Lipford, 2017; I. Williams, 2012). A comic book might be considered an unconventional educational intervention for new physicians, especially given the historical connections that comics have with frivolity and juvenilia. However, graphic medicine suggests that comics can improve health professional education (de Rothewelle, 2018; Glazer, 2015; M. Green, 2013; Green & Myers, 2010; Squier, 2015). To test the premise of graphic medicine, this study aimed to determine whether comics can improve the professional identity formation of junior doctors. This was accomplished through a multi-year trial of an internship comic book handbook that was specially designed to be used as part of an internship orientation program at Mackay Base Hospital.

Challenges of internship

This study addressed internship because the challenges of modern internship programs have created an urgent need for innovative programs that can support new doctors. In Australia, this first year of paid practice is an internship of structured rotations that new doctors must pass before becoming professionally accredited. Many doctors struggle during this time of transition (Shanafelt et al., 2002), particularly with burnout, compassion fatigue, anxiety and depression. While doctors already experience more burnout than the general public (Shanafelt et al., 2012), interns report higher incidents of burnout than other doctors (Beyond Blue, 2013). As physician burnout can negatively impact patient care (Shanafelt et al., 2002), there is an urgent need to address these factors.

These challenges are compounded because the number of incoming interns are increasing, while the faculty to train them are in shorter supply (Joyce, 2013) due to limited resources and a “rapidly changing acute health care setting” (Ahern et al., 2016, p. 374). This can lead to interns being seen to occupy training positions that don’t contribute to the running of the hospital (Duckett, 2012), while their training can be hampered by “faculty members’ diminished interest in teaching, shortened training times, and increasing clinical demands on faculty” (Wald et al., 2015, p. 757).

In response to the changing face of internship, in 2015, the Australian Health Ministers’ Advisory Council published a review of medical intern training that noted that common challenges of internship include “getting used to a greater level of responsibility, adapting to the culture and expectations of the workplace, learning to work in teams and managing sometimes stressful, demanding situations” (Wilson & Feyer, 2015, p. 1). While the review recommended major structural and governance changes, alongside these major changes, there is also a need for smaller-scale educational interventions to prepare medical students for transition into professional practice. The framework of graphic medicine suggests that comics could be a low-cost way to address this need. Accordingly, the intern comic book was designed in consultation with the Mackay Base Hospital staff and past

interns as a low-cost way to reduce intern burnout by addressing many of the common challenges of internship identified by the Australian Health Ministers' Advisory Council.

Personal identity formation

The framework of personal identity formation (PIF) (Inui, 2003) was used while designing the comic to help theorise the challenges of internship. PIF has come to be regarded as “the foundational process one experiences during the transformation from lay person to physician” (Holden et al., 2012, p. 245), a process that ideally serves to “tether or anchor students to their personal principles and the core values of the profession and help them navigate through the inevitable conflicts that arise in training and practice” (Rabow et al., 2010, p. 311).

This transition is ongoing and nonlinear, but it comes under particular stress during internship, as interns' new identities as doctors come into conflict with their previous and pre-existing identities as people and medical students, which can lead to anxiety and uncertainty (Cruess et al., 2014). Forming a professional identity can be especially challenging when “learning of the non-medical skills required to succeed in a typical hospital is often overlooked” (Nasir et al., 2018, p. 9). In addition, PIF is often influenced by what is known as the “hidden curriculum” of norms and practices in the hospital, which may not be explicitly stated and which may, at times, contradict what is taught in medical school (Herman, 2019).

Key elements that can support PIF include personal reflection, an understanding of the contextual and interpersonal nature of professional identity and constructive roleplaying as a means of supporting and exploring multiple identities (Cruess & Cruess, 2017; Ellis & Hogard, 2020; S. Williams, 2014). The intern comic was designed to use visual and multimodal design, informed by literature on educational comics and graphic medicine, to encourage all of these elements (Al-Jawad, 2013; McCloud, 1993).

Graphic medicine

Galvanised by the term “graphic medicine”, interest in the use of comics in medical contexts has increased significantly over the past decade, which has inspired an annual academic conference, a 2015 manifesto published by Penn State University Press (Czerwiec et al., 2015), a section in the *Annals of Internal Medicine* (Cohen & Haber, 2015; Montoya, 2015) and a growing body of research. The field is still relatively new and encompasses a variety of approaches. At the root of graphic medicine are (auto) graphic narratives about illness and treatment, with Justin Green's (1972) underground comic *Binky Brown Meets the Holy Virgin Mary* often cited as a foundational text and an expanding canon of acclaimed graphic novels such as *Mom's Cancer* (Fies, 2011), *Cancer Vixen* (Marchetto, 2014), *The Bad Doctor* (I. Williams, 2014), *Taking Turns: Stories from HIV/AIDS Care* (Czerwiec, 2017) and *Rx: A Graphic Memoir* (Lindsay, 2018), as well as shorter works. For example, a comic by Isabel Hanson and cartoonist Safdar Ahmed

(2019), published in *The Guardian* in 2019, uses a narrative about a first-year doctor and a patient to interrogate the systemic problems of medical education. Graphic medicine also includes instructional and informational comics designed for patients, educational comics created to teach medical students and diverse practices of drawing and recording experiences of healthcare, including online comics, self-published zines and private sketchbooks.

Within the emerging field of graphic medicine, there are several theories as to what comics can add to health professional education. I. Williams (2012) suggests that they “have a particular role to play in the discussion of difficult, complex or ambiguous subject matter” (p. 21) and M. Green (2015) argues that “by empowering students to think metaphorically using images that depict the experience of becoming a professional, comics can give voice to the unsettling worries and concerns that may be difficult to articulate through words alone” (p. 775). Comics typically use subjective, autographic drawing to depict personal contexts of healthcare, and Nayar (2015) identifies their potential for “render(ing) medicine and health care into cultural practices rather than [being] ‘mere’ scientific projects” (p. 173).

These potentials to visualise the unsayable or unseen aspects of medical practice are enhanced from a pedagogical perspective by the way comics require readers to braid together multiple narrative strands, perspectives and moments in order to “fill in the blanks and complete the narrative” (p. 2), which Green and Myers (2010) contend could “enhance students’ observational and interpretive abilities” (p. 2).

Methods

Educational intervention – Intern Survival Comic Book

Literature on the potential of graphic medicine served as an inspiration for the Intern Survival Comic Book, which is a 24-page pamphlet that was drawn by AH in close collaboration with Mackay Base Hospital’s Medical Education Unit (MEU) in 2014. The comic was deliberately drawn in a sketchy style that was designed to reflect the “in-progress” nature of personal identity formation. The comic book (see Figure 1) was distributed to interns as part of their pre-service orientation program at the beginning of their internship. In the final weeks of internship, surveys (2013–2017) and interviews (2014) were used to determine if the comic book affected the interns’ perceptions of their preparedness to manage the transition from student to professional. This project received ethics approval from the University of Adelaide Human Research Ethics Committee (number H-2014-25) and the Townsville Hospital and Health System Human Research Ethics Committee (number HREC/14/QTHS/60).

Figure 1

Pages Addressing Compassion Fatigue and Depression From the Comic Distributed to Interns at Mackay Base Hospital, 2014–2017

DX: Compassion Fatigue



RX: O₂ (at least) QID



You have to put on your own mask first.

You need a steady supply of positive energy in order to help others.



Although the bag may not appear to inflate, oxygen is flowing

Dogged by

Thanks so much, doc.

Oh, no problem.

You're going to be just fine! ☺

What is the point of ANYTHING?

BLACK DOG

More than 25% of doctors* have a minor psychiatric disorder like depression or anxiety.

40% of doctors believe that doctors who have depression or anxiety are less respected by their colleagues.

This stigma means many doctors are reluctant to get help they need.

sure, of course I can cover for you tonight - what? No, I'm fine... I'm fine.

The stigma is unfounded - and DANGEROUS - it may contribute to the higher rates of suicide in doctors compared to the general public.

- Many great people have struggled with mental illnesses.

Churchill

Take heart! With help, we can keep these beasts on a leash!

Great Mental Health resources online

HELP is AVAILABLE!
 ↳ 24 hour hotlines ↳

- QLD Employee Assistance Program ☎ 1 300 361 008
- Doctors' Health Advisory Service ☎ 07 3872 2222
- Lifeline - ☎ 13 11 14
- Suicide Advice - ☎ 1300 659 467
- Drug & Alcohol counselling ☎ 1 800 888 236

↳ <http://amacom.au/doctorshealth>
 ↳ <http://jmohealth.org.au>

* Statistics taken from Beyond Blues National Mental Health Survey of Doctors & Med Students

The content of the comic was decided upon before the publication of the Australian Health Ministers' Advisory Council's review of medical intern training, but it was inspired by many of the same challenges of internship identified by the authors of the

review—“getting used to a greater level of responsibility, adapting to the culture and expectations of the workplace, learning to work in teams and managing sometimes stressful, demanding situations” (Wilson & Feyer, 2015, p. 1). These challenges were divided into seven domains after consultation with MEU staff and past interns: “transitioning from being a student to being a professional”, “managing my time at work”, “moving to a new environment”, “referring patients to senior doctors”, “working with other staff members”, “dealing with personal stress and/or anxiety” and “dealing with my own compassion fatigue”. Each of these domains was given between half a page and 2.75 pages within the comic, although there was naturally some overlap between domains. These seven domains were later used in the surveys, where interns reported how well they had been prepared in each domain.

The comic was printed and distributed to interns during the 2014–2017 years in welcome packs, along with other brochures, printouts and schedules, on their first day of a week of orientation and training. The comic was not discussed in a significant way during the orientation program so as to not bias the interns against its effectiveness. The only change in content over the 4 years was that the year on the cover and the names of MEU staff were updated as necessary.

Surveys 2013–2018

To assess how the comic impacted the interns’ PIF, a survey was conducted with interns in the final week of their internship to allow them to reflect on their training as a whole. This survey was designed specifically for this study and was administered in 2013–2017, with the 2013 cohort, which did not receive the comic, serving as a control group. Survey participants were recruited from interns who were on site at Mackay Base Hospital in the final week of internship during a weekly education session run by MEU staff. Surveys were distributed by MEU staff as part of the session, and the interns were given time to voluntarily participate. Participants signed a consent form, and their responses were de-identified and kept anonymous. During the years surveyed, the mean number of interns at the hospital each year was 38, and the mean response rate was 39% (Table 1).

The first part of the survey (Table 2) asked participants to use a 7-point Likert scale to report how well prepared they felt in each of the seven domains addressed by the comic, along with an additional domain “communicating with patients and their families”, which was not addressed in the comic and, therefore, served as a control (1 = *not at all prepared*; 7 = *extremely well prepared*).

The second part of the survey asked the interns to rank how “helpful and/or useful” they found publications that had been distributed to them by Mackay Base Hospital using a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*) or giving a mark of 0 if they did not remember the publication (Table 3). The other publications mentioned in the survey included an HR manual on hospital processes, handbooks for specific

clinical rotations (e.g., the cardiology ward), a pamphlet developed by Mackay Health Department about living in Mackay, a brochure about ongoing hospital renovations and the Australian Curriculum Framework for Junior Doctors.

Table 1

Number of Interns at Mackay Base Hospital Each Year Compared With Number and Percentage of Interns Who Were Surveyed for This Study

Year	2013	2014	2015	2016	2017	Average/Year
Total interns	29	34	40	44	43	38
Number surveyed	16	14	18	6	18	14.4
Percentage surveyed	55%	41%	45%	13%	41%	39%

Table 2

Perceptions of Interns at Mackay Base Hospital of How Well They Have Been Prepared by the Medical Education Unit for Various Challenges of Internship, 2013–2017

	2013 (n = 16)	2014 (n = 14)	2015 (n = 18)	2016 (n = 6)	2017 (n = 13)
Moving to a new environment	Mean 4.69 SD 0.6696	Mean 5.07 SD 0.8337	Mean 5.71 SD 0.9852	Mean 5.83 SD 0.4082	Mean 5.31 SD 1.4367
Transitioning from being a student to being a professional	Mean 4.63 SD 0.6607	Mean 5.20 SD 0.7746	Mean 5.35 SD 0.7859	Mean 5.67 SD 0.5164	Mean 5.23 SD 1.3009
Referring patients to senior doctors	Mean 4.38 SD 0.625	Mean 4.87 SD 0.9904	Mean 4.82 SD 1.2367	Mean 6.00 SD 0.6325	Mean 4.62 SD 1.2608
Managing my time at work	Mean 4.44 SD 0.6339	Mean 4.47 SD 0.9155	Mean 4.82 SD 0.80896	Mean 5.17 SD 0.4082	Mean 4.54 SD 1.0500
Dealing with personal stress and/or anxiety	Mean 4.44 SD 0.6339	Mean 4.47 SD 1.0601	Mean 4.88 SD 1.0537	Mean 5.67 SD 0.8165	Mean 5.00 SD 1.15470
Dealing with my own compassion fatigue	Mean 3.69 SD 0.5268	Mean 3.80 SD 1.3202	Mean 4.35 SD 1.1147	Mean 5.00 SD 0.63246	Mean 4.46 SD 1.1266
Working with other staff members	Mean 5.00 SD 0.7143	Mean 5.20 SD 1.08233	Mean 4.88 SD 0.6966	Mean 5.67 SD 0.8165	Mean 5.54 SD 0.9674
Communicating with patients and their families	Mean 4.63 SD 0.6607	Mean 4.80 SD 1.2071	Mean 4.59 SD 1.1213	Mean 5.67 SD 0.5164	Mean 4.54 SD 1.4500
Total preparedness (Mean, all domains)	Mean 4.48 SD 1.1838	Mean 4.73 SD 1.1056	Mean 4.93 SD 1.0444	Mean 5.58 SD 0.6469	Mean 4.90 SD 1.2504

7-point Likert scale (1 = *not at all prepared*; 7 = *extremely well prepared*)

Table 3*Helpfulness/Usefulness of Publications Distributed to Interns at Mackay Base Hospital, 2013–2017*

Publication	Recall % 2013–2017	Overall mean, including all participants	Adjusted mean, including only respondents who recalled the publication
Orientation guide	92% (n = 47)	4.900	5.326
Comic book	92% (n = 46)	4.373	4.745
HR guide*	72% (n = 48)	3.299	4.604
Rotation handbook	56% (n = 28)	3.100	5.554
Guide to Mackay*	60% (n = 40)	2.223	3.725
Renovations brochure	34% (n = 17)	1.340	3.941
Curriculum framework*	30% (n = 20)	1.284	4.300

Note: ranked using 7-point Likert scale (0 = *not recalled*; 1 = *not helpful*; 7 = *extremely helpful*)

* publications distributed 2013–2017; all others distributed 2014–2017.

Several methods of quantitative data analysis were used to interpret the results of these surveys. Aggregate mean scores in each domain were calculated for each year and compared to observe variations in feelings of participation and reception of the publication over time. A ranked t-test for statistical significance and effect size (Cohen's *d*) was also used to compare the variations in reported preparedness between 2013, when the comic was not used, and 2014, when it was first introduced. Additionally, we ran a single variable linear regression analysis across all years surveyed, using each intern's total preparedness score (calculated from the sum total of all eight domains) as a dependent variable and the score they gave each publication as an independent variable (Figure 2) to determine whether there was a relationship between how the interns felt about the materials they received and how prepared they felt. Both these tests yielded useful results despite the small sample size. The small sample size also made it possible to categorise each response in terms of qualitative codes that were drawn out of data from interviews with the interns.

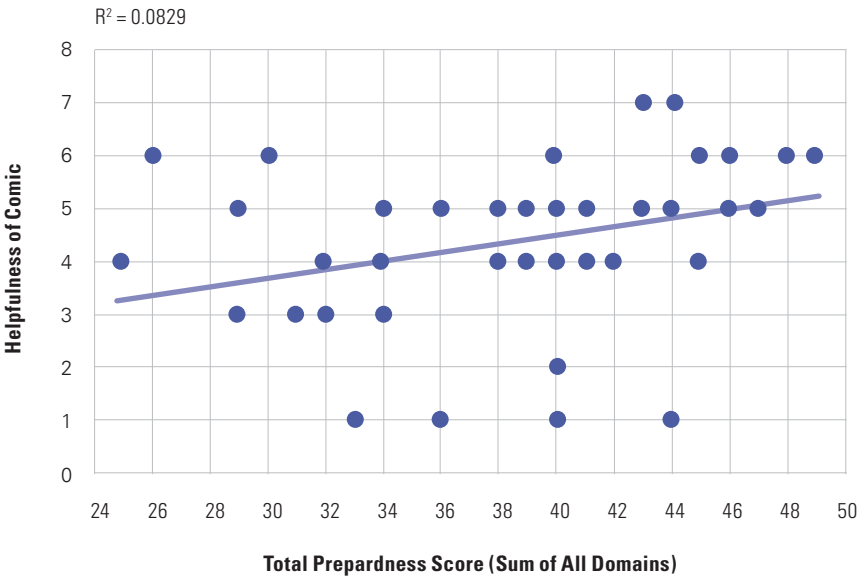
Interviews 2014

To gather richer qualitative data, we also conducted semi-structured individual interviews with nine interns from the 2014 cohort in their final month of training. Interview participants were recruited by MEU staff by phone and e-mail, and interviews were scheduled at various locations in the hospital where the participants were working. AH, who had no prior relationship with the participants, conducted the interviews. The interviews were semi-structured and lasted between 5 and 10 minutes, with questions revolving around interns' perceptions of the comic and its helpfulness. The participants consented to being recorded, and their responses were transcribed and anonymised. The transcripts were then analysed by AH using theoretical thematic analysis (Braun & Clarke, 2006) focused on discovering thematic codes that represented the variety of responses the interns had towards the comic book. These codes were validated by matching them to groups of thematically similar survey responses. In this way, the interviews provided a depth of qualitative data that helped to interpret the quantitative survey results.

Figure 2

The Relationship Between Preparedness and Perception of the Intern Survival Comic Book, 2014–2017

Mean Preparedness Compared to Opinion of Helpfulness of Intern Survival Comic Book



x-axis = each intern's combined level of preparedness reported across all eight domains surveyed
y-axis = how each intern ranked the *Intern Survival Comic Book* on a 7-point Likert scale (0 = did not recall; 1 = not helpful; 7 = very helpful)

Results

Preparedness survey

Following the introduction of the comic in 2014, feelings of preparedness to meet the challenges of internship increased in all domains (Table 2). In particular, a ranked t-test of the results from the 2013 and 2014 cohorts shows a statistically significant ($p = 0.0152$) increase in the domain “transitioning from being a student to being a professional”, from 4.63 in 2013 to 5.20 in 2014, with an effect size (Cohen’s d) of 0.95.

In the four trial years, every domain addressed in the comic remained above the 2013 control except “working with other staff members”, which was lower in 2015. The domain that the comic did not address, “communicating with patients and their families”, was lower in both 2015 and 2017. (NB: Significantly fewer interns were available to participate in the 2016 survey than in other years, which could account for that year’s higher scores.)

Publications survey

The publications survey demonstrated that the comic was widely recalled by most interns, that it was generally seen as helpful and that the interns had a wide range of feelings about the use of comics in the context of their orientation (Table 3). Most participants did not recall all publications, except the comic and a guide to orientation, which were both recalled by 92% of interns. Among interns who remembered the comic, 89% rated it as at least somewhat helpful (≥ 4).

The overall mean score received by the comic (4.37) ranked second, below the orientation guide (4.90). When the means were adjusted to only count interns who recalled each publication, the clinical rotation handbook ranked highest (5.55), followed by the orientation guide (5.33) and the comic (4.75).

Each individual survey response was also analysed to determine whether the comic was ranked as more or less useful than other publications. From this analysis, it was possible to divide the intern cohort into four groups based on the following qualitative codes, which were then explored further using the 2014 interviews:

- Resistant (15.69%, $n = 8$)—This group gave the comic a score of three (“not helpful or useful”) or lower or four (“somewhat helpful/useful”) but gave all other publications that they remembered a score of five (“helpful/useful”) or higher.
- Ambivalent (17.69%, $n = 9$)—This group gave the comic a score of four (“somewhat helpful/useful”) and gave at least one other publication an equal or lower score. Interviews suggest that these interns saw some value in the comic’s content but found the format to be out of line with their expectations for professional medical education.
- Ecumenical (45.10%, $n = 23$)—This group gave the comic a score of five (“helpful/useful”) and gave at least one other publication an equal or higher score. This group tended to appreciate most publications they remembered, including the comic.

- Enthusiastic (13.73%, n = 7)—This group gave the comic a score of at least five (“helpful/useful”) or higher and gave all other publications a lower score. For this group, the comic was the most helpful publication they received.

These codes were used in interpreting the interviews with the 2014 interns, which provide a more detailed picture of the ways the intern cohort reacted to the comic handbook.

Resistant

An average of 15.60% of the interns (n = 8) either found the comic not helpful or ranked it the least helpful publication they received. In the interviews, this corresponded with an unwillingness in some interns to engage with the comic book format and a belief that the format was incongruent with both medical education and their professional identity.

The handbooks that were, like, “here’s what you need to know” seemed more like this is the information that I need to know, and this was more, like, just for fun. ... Like I still don’t know if it actually gives information or if it’s meant to be for fun. Like, is it? Now I need to go read it. (15)

This response can be understood in the context of the “hidden curriculum” of medical education authorising a certain kind of literacy that could be considered straightforward or didactic. For example, one intern suggested that bullet points would help improve the comic.

Dot points would be the other thing. Dot points are fantastic. The medical industry is all about quick information and as concise as possible. (13)

The invocation of “the medical industry” by this intern underlines a perceived connection between professionalism and communication strategies. Although interns are often required to provide quick and concise information, this quote may suggest a disregard for “slower” attributes of a professional medical identity, such as compassion and curiosity.

Ambivalent

Another group of interns (17.69%, n = 9) found the comic book to be “somewhat” helpful, and among the interview participants there were many reasons for this ambivalence. One intern said it was “mildly entertaining. I enjoyed the way it was written and drawn” but felt the comic wasn’t particularly helpful since “a lot of the stuff it covered we discussed at the end of med school anyway” (13).

Another intern said that she initially wasn’t interested in reading the comic during orientation. Later, she picked it up “late one night” and “read it randomly”. She found it “quite humorous” and said it accurately reflected some of her struggles, but she felt that most of the other interns would need considerable encouragement to read the comic (19).

The sentiment that the comic was relatable was shared by another interview participant, who called it “quite accurate” but expressed a “personal preference” for more “cut and

dry” presentation of material. However, upon reflecting on the mental health issues covered in the comic, which were things that “they wouldn’t say ... in a regular orientation manual for sure”, this intern revised his earlier comments and concluded that the comic format was preferable for those topics.

The comic book keeps it light that way with those sorts of issues, so it’s really good for that. To have it like cut and dry, I don’t know, I’d probably prefer the comic book for something like that. (17)

Taken together, these comments represent a range of opinions about the value of the content of the comic, from the intern who felt the comic only repeated familiar content to the two interns who felt that it was relevant to struggles that they were facing as interns. However, they share a hesitant scepticism that the comic format possesses the authority to be effective in professional identity formation.

Ecumenical

The largest group in the surveys (45.10%, n = 23) ranked the comic as about as helpful as the other materials they received. In the interviews, this perspective was reflected in the thoughts of a number of interns, who did not articulate any concerns about the comic book format in contrast to the concerns expressed by the resistant and ambivalent interns.

I reckon a comic is a great idea. If you just had a list of dot points of what to do and what not to do, you’re not going to remember it as much as this. And it’s kind of got the emotional appeal as well. ... Having this was, I reckon, one of the best forms, because it meant that everyone read it, and it’s the only thing that I could really remember from orientation. (11)

These interns expressed an interest in absorbing whatever material was available, typified by one intern, who stated:

I’m one of those people that read everything cover to cover, so I did read it cover to cover. (12)

Even though the comic book was an unexpected format to use for professional identity formation, these interns appreciated the visual style and the lighter tone of the comic.

I’d never seen anything like it before. ... You get a lot of paperwork, like piles and piles of paperwork, and this is just something extra that is pleasant and enjoyable to read, whereas the other stuff is all dry or it’s all the same. (12)

For these interns, the comic was seen to add value to their orientation by addressing some emotional aspects that weren’t covered elsewhere in the education program but also by providing some humorous relief from the typical pedagogical structures.

I mean, I can relate to some of the experiences they are dealing with in this. It also had humour, so that kept it interesting. Yeah, I enjoyed reading it. I thought it was useful and realistic in a lot of ways. (18)

Enthusiastic

Finally, there is the group of interns (13.73%, $n = 7$) who said the comic was the most helpful/useful publication they received. This group corresponds with several interview subjects who said the comic framed the challenges of internship in a way that reduced their anxiety.

This was awesome. ... It just helped to calm a lot of my nerves, especially the first day. ... It's got all the day-to-day things that you worry about and just puts it on a piece of paper and puts it in perspective that it's not that bad. (14)

Another intern reported that she found herself thinking back on the comic throughout the year for tips on how to deal with professional challenges.

I was happy to read through it because there were little gaps of time. It was very amusing, and it was really quite true. I was very happy to receive it, rather than a wordy document. ... I would say it's very practical and relevant. ... It sort of gave me tips in certain situations. (16)

She felt that the visual format of the comic helped her to remember its content better, noting that “it sticks with you longer. It's realistic, much easier to read. ... It's *good*, you know”. This intern's only suggestion to improve the comic was to make it more clearly authorised as a structured part of the orientation program.

I would just push for this to be more a formal document, and say, “This is part of your orientation handbook”, and more people will get onto this. ... Do you think we could allocate maybe 15, 30 minutes, because in orientation it's all just medical things, medical training, what do you do in an emergency, so have a practical life tips session. Tell them, “Go through this book, how are you going to face waiting, pushing, doing administrative work”. (16)

This comment highlights a theme throughout the interviews, that the interns decided on their own whether or not to engage with the comic.

The interview data suggested that the interns who found the comic useful/helpful also felt that they had been better prepared by the end of their intern year, and this hypothesis was supported by quantitative analysis of the survey data. To measure the relationships between the interns' overall feelings of preparation and how useful they found individual publications, we ran a single variable linear regression analysis using each intern's total preparedness score (calculated from the sum total of all eight domains) as a dependent variable and the score they gave each publication as an independent variable (Figure 2). This test showed a statistically significant ($p = 0.04$) and mildly positive ($r = 0.29$) correlation between how helpful the interns found the comic and how well they felt they had been prepared for the challenges of internship ($r^2 = 0.08$; coefficient = 1.01; standard error = 0.48). The comic was the only publication significantly correlated with preparedness ($p < 0.05$).

Discussion

Despite the importance of internship and the emergence of graphic medicine, there is still a “lack of objective, accessible and current data, for example, on the level of graduate preparedness, the quality of the intern learning experience and the extent to which learning outcomes are being achieved” (Wilson & Feyer, 2015, p. 6), and “there continues to be a lack of empirical studies investigating how or why comics are being used in the domain of health care, social care and their subdomains” (Farthing & Priego, 2016). This article has attempted to partially address both of these gaps by addressing the paucity of studies that examine the role of graphic narratives in supporting professional identity formation and the lack of longitudinal studies of graphic medicine approaches to medical education in general.

This pilot study found the intern comic helped interns at Mackay Base Hospital prepare for the challenges of internship. The wide range of responses to the comic book format in the interviews suggests that the interns who found the comic helpful may have been more receptive to non-traditional and multi-modal learning tools and, therefore, were more equipped for the challenges of professional medical practice, while the interns who had rigid expectations of medical education and professional communication were less prepared for the realities of internship.

As comics are still relatively uncommon in medical education, the interns’ views also illuminated some of the ways they are affected by more conventional printed materials. Often support for interns’ PIF is partially delegated to generic printed materials, such as employee handbooks and brochures on wellbeing and mental health, where Hafferty (1998) argues that the hidden curriculum is often conveyed implicitly. Although the intent of these materials is supportive, they often follow generic structures, such as didactic litanies of wellbeing tips or vague personal narratives from established professionals, where weeks in therapy may be summarised in three words “valuable lessons learned!” (Australian Medical Students’ Association & New Zealand Medical Students’ Association, 2011, p. 34).

Goldie (2012) observes that “students’ professional identity formation is influenced more by the informal and hidden curricula than formal teaching experiences” (p. 645), and some of the interns’ comments suggested that their understanding of professional medical communication had been shaped by the hidden curriculum of medical education, where memorisation of large volumes of material is seen as essential (Nasir et al., 2018; Qiao et al., 2014).

While many interns used the language of paperwork, dot points, wordy documents and “here’s what you need to know” to describe what they expect of medical communication, it is notable that discussions of mental and emotional health were described as difficult to convey in that kind of professional communication. The comic was seen as an exception

not only because it was “pleasant and enjoyable” or “just for fun” but also because it addressed emotional and mental health.

Although educational comics are more frequently researched for use in schools and language learning (Jee & Anggoro, 2012; Kneller, 2009; Lazarinis et al., 2015; Leber-Cook & Cook, 2013; Mendelson et al., 2017; Tilley, 2013), the results of this study, particularly the correlation of a positive reception towards the intern comic book and feelings of preparedness to address the challenges of becoming a medical professional, demonstrate that comics can also be effective with highly educated adults in professional scenarios. Despite (or perhaps because of) being seen as “just for fun”, the comic had a positive impact on PIF, which suggests that further use of comics in internship programs could improve outcomes for interns, with the potential follow-on effect of improved patient wellbeing.

Limitations

Limitations of this study include the small sample size and an inability to determine the cause of any of the variations between the years, due to possible changes in the student cohort and other potential developments in medical education more broadly during the time period studied. Additionally, while comparisons between the preparedness survey and the publications survey demonstrate a correlation between positive feelings about the comic and feelings of overall preparedness, it is not possible to say whether one caused the other. This study did not include observation of how the interns used the comic and, thus, relies on interns’ subjective recollections from earlier in the year. Given that some interns suggested that the comic be more formally included as part of their training program, further study would be useful in determining whether making it a more structured part of the curriculum, through group discussions or reading groups, would be beneficial. This comic was designed specifically for Mackay Base Hospital and included depictions of the hospital, the city of Mackay and the local MEU staff. Versions of this comic, or others like it, could be inexpensively implemented in other hospitals, helping to meet the challenge of improving intern education “in a way that minimises the additional learning demands on students and maximises the prospect of the skills being learned in a readily transferable manner” (Nasir et al., 2018, p. 9).

Conclusion

Overall, this study supports the premise of graphic medicine and suggests that comics can be a useful tool for medical education, even at the postgraduate level. The surveys of interns at Mackay Base Hospital demonstrated that once the comic was introduced as part of the orientation program, levels of reported preparedness increased. Furthermore, interns who appreciated the comic were more likely to report higher levels of preparedness, while a similar correlation did not exist for any other publication tested in this study. Interviews with interns who received the comic show that while comics may challenge some doctors’ expectations of professional medical communication, they can

be helpful tools for aiding interns in their professional identity formation and preparing them for the emotional and mental health challenges of internship. Therefore, comics may provide an opportunity for medical educators to support the personal identity formation of interns and other junior doctors.

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