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# Learning by drawing: understanding the potential of comics-based courses in medical education through a qualitative study

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## Abstract

In recent years, medical educators have increasingly incorporated comics into their teaching to promote humanism and empathy and to encourage reflective practice. However, it remains unclear how and to what extent comics-based courses effectively address persistent challenges in medical education, such as the need for more engaging, multimodal learning strategies and the cultivation of emotional intelligence alongside clinical competencies. The aim of this study is to investigate the experiences of students who have enrolled in courses on comics and medicine during medical school. Students in North America who had taken such a course during the previous 5 years were invited to participate in an interview about their experiences. 17 students from 10 different medical schools in North America were interviewed. To explore the students' views on the value of such courses to their medical education, we used a constructivist grounded analytic approach, employing thematic analysis to understand and interpret our interview. Students reported that comics-based courses support key aspects of their medical training that traditional pedagogical approaches may overlook, such as fostering self-reflection, enhancing empathy, and encouraging creative engagement with complex medical narratives. Moreover, comics contributed to their individual and collective professional identity formation by providing a space for introspection and shared discourse.

**Keywords** Comics-based courses, Professional identity formation, Graphic Medicine, Comics-based research, Undergraduate medical education, Arts-based education

## Background: the role of comics in medical education

In recent decades, medical education has evolved to include the teaching of health humanities and social sciences alongside basic and clinical sciences, in response,

in part, to the increasing corporatization and depersonalization in medicine [3, 38, 44]. Though the scientific basis of medical practice has been the cornerstone of medical education since the release of the influential Flexner Report in 1910, emotional and humanistic skills have been increasingly seen as vital to medical students' professional development [24]. The goal is to train well-rounded physicians who are both scientists and humanists [40, 45]. In support of these newer curricular objectives, medical educators now routinely include in the medical curriculum topics such as the doctor-patient relationship, professionalism, and communication [21]. To bridge the gap between the scientific and humanistic

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aspects of medical practice, arts-based pedagogies have been introduced to attend to humanistic and emotional skill building in medical education.

In this context, medical educators have begun to use comics in their teaching, especially in the United States and in the United Kingdom. Some educators have taken a piecemeal approach by inserting comics into their lectures and learning activities, while others have more fully embraced the medium by developing courses devoted to the topic of comics in medicine. Both approaches have the ambitious goal of advancing professional and emotional skills in communication, self-reflection, and empathy [15].

While recognizing the value of engaging with narrative art generally—be it prose, poetry, film, or other mediums—our study intentionally narrows its focus to comics as a teaching method because of several unique features of the medium [27]. For the purposes of this study, we use the term “comics” to refer to visual narratives that integrate images and text in a structured sequence. In this manuscript, we sometimes use the terms “comics” and “graphic narratives” interchangeably though strictly speaking, graphic narratives refer to narrative work in the medium of comics [28]. And, while they are no doubt useful, we are not exploring the use standalone illustrations or infographics in medical education. We focus on comics because they uniquely combine visual and textual storytelling, offering a multimodal approach that differs from purely textual or visual mediums, thereby galvanizing multiple access points for learning [31]. Combining image and text simultaneously allows for nuanced depictions of emotions, temporality, and embodiment in a way that is particularly suited for exploring the complexities of illness and caregiving. For example, the visual (and often metaphorical) representation of gestures and fragmented layouts in comics can mirror the physical and psychological fragmentation often experienced by patients, a feature less explicitly conveyed in other narrative forms. Comics are also, by design, more visually appealing than the typical lecture, textbook, or clinical case report. They convey stories in a way that fosters emotional engagement, which tends to make them more memorable than traditional fact-based learning [13]. Further, they require students to participate in meaning-making by drawing inferences in the spaces between comic panels, thus building a more collaborative learning experience [13]. While these affordances do not necessarily make comics “better” than other mediums, they do offer unique opportunities for learners to understand diverse perspectives through visual storytelling.

Comics are used in medical education for varied reasons, including delivering information, promoting visual literacy, fostering critical reasoning, sparking

personal reflection, and nurturing creativity [43]. Regardless of their intended purpose, instructors using comics generally have students engage in one or both of two kinds of activities: 1) reading/discussing medically relevant comics (consumption); and 2) creating comics to share experiences and emotions (production) [29]. Through these instructional methods, educators have advocated the use of comics as tools to improve cognitive skills [25, 39], teach community medicine [2], improve empathy [32], foster better communication [30], advance various other doctoring skills [16], and address multicultural issues [28]. Adamidis et al. [1] demonstrated that using creative approaches such as comics in online lectures are effective at promoting understanding and strengthening essential physicians’ skills such as communication, empathy, and emotional intelligence. Their research showed that comics not only raised awareness but also helped to cultivate skills crucial to the field of Palliative Care. Similarly, Ronan and Czerwicz [41] implemented a comics-based curriculum in a neurology residency, using non-fiction graphic memoirs and drawing exercises. The curriculum was well-received, with 97% of residents finding it valuable, and participants reporting improved understanding of neurological symptoms, patient communication needs, and increased empathy.

Medically themed comics are also a powerful way to show the lived experience of patients facing illness and/or interacting with the health care system. Integrating stylistically and thematically diverse comics into the medical school curriculum has the potential to stimulate self-reflection and empathy, and are well suited to facilitating a “genuine, emotionally engaged interest in learning more about the complexity of the patient’s point of view” [19].

For these reasons, among others, comics about health and medical issues have proliferated in recent years, stimulating the development of the field of Graphic Medicine (GM). GM concentrates on scholarly and creative work at the intersection of the medium of comics and the discourse of health care [47]. Today, GM is widely recognized both inside and outside the academy, inspiring scholars, artists and clinicians who seek to better understand the diverse experiences of those facing illness, caring for a loved one with health problems, or working in the health care field. While GM has begun to establish itself as a scholarly field, research supporting its effectiveness as a strategy to improve medical education is still in its early stages [2, 8, 14]. With this article, we aim to contribute to this body of work by describing the use of graphic medicine in medical schools. We will present results from a qualitative study of students across North America who enrolled in courses using comics as part of their medical school training.

Creating drawings, reading comics, and having discussions sparked by visual artifacts can have an impact on the formation of students' professional identity [9, 42]. Therefore, the aims of this article are threefold: 1) to contribute to the existing literature by examining the diverse ways in which comics-based courses are integrated into medical education; 2) to analyse the impact of these courses on the attitudes and perceptions of future healthcare professionals, highlighting their role in fostering empathy and understanding; and 3) to investigate the influence of such educational activities on the development of students' professional identity and self-awareness.

## Materials and methods

To address these aims, a qualitative study was undertaken. We interviewed a sample of North American medical students ( $n=17$ ) who participated in a course that integrated comics into the curriculum. To recruit participants, a preliminary scan of graphic medicine courses across North America was carried out. This scan was based on an extensive online search, using specific keywords and academic databases, and was further informed by the direct expertise, professional connections, and knowledge of one of the authors (MG), who is a leader in the graphic medicine community. We limited our sample to medical schools in North America (U.S. and Canada)

because comics and graphic narratives are more commonly used in professional education in North America than elsewhere. Courses were considered for inclusion if they: a) were taught within health professional schools; b) used comics in a variety of activities and assignments to address medical topics; and c) relied on English as the language for instruction. We document and summarize the descriptions of 17 elective courses in Table 1, which includes contributions from students at 10 medical schools. Although some of the students were enrolled at the same institutions, students may have taken the courses at different times and the courses themselves may have evolved, so students' descriptions may vary for the same institution. All sampled courses were elective, meaning that students voluntarily enrolled. Additionally, and given that the background discussion focuses mainly on medical education, this study primarily reflects the experiences of medical students, though insights from students in other health professions contribute to the broader understanding of comics-based learning in healthcare training.

Though the courses differ in focus, duration, size, purpose, and timing, they had one or more of the following activities in common: reading and discussing medically themed graphic narratives; engaging in creative activities such as drawing or creative writing; or creating a comic narrative based on personal experience. Given the

**Table 1** Course description

Type of course	Course activities	Grade
Elective	Reading graphic novels, discussing themes, drawing and preparing a final project (comics)	pass/fail
Elective	Introduction to cartooning, drawing panels and preparing a final project (comics)	evaluation with no grades
Elective	Introducing graphic medicine, discussing comics, engaging in drawing exercises, discussing drawings	no grades
Elective	Learning how to draw, preparing a project (comic) and discussing it	pass/fail
Elective	Introducing comics, drawing a comic about something stressful in medicine and then discussing stories in public setting	pass/fail
Elective	Reading articles about graphic medicine, examining graphic novels, engaging in drawing exercises	pass/fail
Elective	Introducing graphic medicine, discussing how to use this material in their career, and engaging in drawing exercises	no grades
Elective	Reading and discussing 5 graphic novels	pass/fail
Elective	Learning about graphic medicine and comics and doing a few introductory exercises	evaluation without grades
Elective	Reading graphic novels and drawing a two-page comic narrative	honors/pass/fail
Elective	All different aspects of medical humanities; group activities (reading and discussing books); opportunity to create a comic	no grades
Elective	Discussing narrative medicine and the use of comics as a storytelling method; engaging in drawing exercise and creating a comic	evaluation without grades
Elective	Discussing comics and reading some graphic novels	pass/fail
Elective	Learning about the history of graphic medicine, its applications in different fields, how it's used in both health care and education; drawing a comic	grades
Elective	Drawing exercises; discussing selected comics	pass/fail
Elective	Reading graphic novels and drawing a final project	grades
Elective	Understanding how to use comics in educational interventions and drawing a comic about it	pass/fail

variability and evolution of course content to meet different educational needs, we relied on the participants' memories to ensure an accurate and faithful representation of their personal educational experiences across different academic years. This variability is important to acknowledge, as it may have shaped students' experiences and the ways in which they engaged with comics as an educational tool.

This study did not receive any external funding. However, participants were offered modest vouchers redeemable at select bookstores and cafés as incentives for participation.

To be eligible to participate, students had to have been enrolled in such a course within the previous 5 years. Students were identified and selected for participation in several ways: 1) by informally reaching out to through the authors' professional networks to identify all the North American medical schools where we knew Graphic Medicine was taught; 2) by contacting teachers of Graphic Medicine who were involved in previous research and asking them to forward an invitation to their current or former students to participate in this study; 3) by distributing flyers and posting on medical school Facebook pages at targeted institutions; and 4) by making announcements and distributing handouts during the annual Graphic Medicine conference held in August 2021. We included students in both pre-clinical (years 1–2) and clinical (years 3–4) stages of training (see Table 2).

Data were collected from students in the form of semi-structured interviews, conducted via Zoom by two of the authors (AS and VM) between May and November 2021. During the interviews, participants were asked to describe and reflect broadly on their experiences of their comics course during medical school. The interview guide was specifically developed for this study, with questions designed to explore the participants' experiences and perspectives in alignment with the research objectives. Although the lecturers involved in the initial study were not necessarily those of the student participants, consultation with their experiences was crucial in generating pertinent and targeted questions for the student interviews.

Questions focused on the following specific topics (Table 3).

This study is grounded in a constructivist-interpretivist paradigm, which recognizes that knowledge is co-constructed through participants' experiences and researchers' interpretations. In line with qualitative research best practices, we ensured rigor and trustworthiness through triangulation, reflexivity, and iterative coding, following established criteria for qualitative inquiry. Researcher reflexivity was embedded throughout the study design and analysis, acknowledging the role of the research team in shaping data interpretation.

**Table 2** Participants' details

Interviewees code	Self-identified gender	Year of attendance the course	Medical school	Other school
1	M	fourth year	Medical College of Wisconsin	
2	F	fourth year	Emory University School of Medicine	/
3	F	fourth year	Emory University School of Medicine	/
4	M	second year	Medical College of Wisconsin	/
5	M	third year	University of Saskatchewan	/
6	F	first year	George Washington University	/
7	F	second year	/	University of Connecticut School of Dental Medicine
8	M	second year	George Washington University	/
9	F	second year	Northwestern Medical School	/
10	M	fourth year	George Washington University	/
11	M	fourth year	Penn State College of Medicine	/
12	F	fourth year	Penn State College of Medicine	/
13	M	first year	Penn State College of Medicine	/
14	F	second year		Massachusetts College of Pharmacy and Health Sciences
15	M	second year	University of Connecticut School	/
16	F	fourth year	Medical College of Wisconsin	/
17	F	fourth year		Massachusetts College of Pharmacy and Health Sciences

**Table 3** Interview

Interview topics
<b>Appreciation of the teaching method</b> Type of skills learnt as a result of the proposed activities: (inductive, visual, narrative, relational, empathetic, self-reflective, related to critical thinking...)
<b>The impact of the course on the learning trajectory</b> and on current approach to patient care Relationship of research findings to participants' choice of specialty
<b>Ongoing interest in comics</b>

**Ethical considerations**

The study, including no sensitive nor personal or clinical data was conducted in agreement with EU-GDPR and the Helsinki Declaration. All data were collected anonymously (EU-GDPR, last line of whereas 26), stored, and analyzed without any possibility to identify the interviewed subjects. The research proposal was submitted to the Human Subjects Protection Office at Penn State College of Medicine who determined that it met the criteria for exempt research according to Penn State policies and federal regulations. Informed consent was secured from all participants, and all interviews were conducted in accordance with relevant ethical regulations and guidelines.

**Research reflexivity**

Reflexivity was a foundational component of our research methodology, critically shaping our approach throughout the study. This concept, grounded in the frameworks of Ashmore [4] and Woolgar [49], involves the continuous examination of our biases, judgments, and practices to ensure that personal perspectives do not inadvertently influence research outcomes. Reflexivity extended across all phases of the research, including the interview process and the subsequent formalization of sociological categories, where knowledge was constructed and situated.

Our team adhered to the comprehensive framework proposed by Olmos-Vega et al. [37] in AMEE Guide No. 149, which conceptualizes reflexivity as an ongoing, collaborative, and multifaceted process. This approach emphasized not just the acknowledgment of researchers' backgrounds but also a critical examination of how prior experiences, motivations, and subjectivities influenced decision-making throughout the research [11].

The research team, comprising a U.S.-based physician with expertise in medical humanities and two European medical sociologists, enriched our data triangulation and analysis. This diversity, while challenging in harmonizing methodologies, proved valuable. The principal investigator (PI) provided critical insights into the medical school context, student backgrounds, and the integration of comics in education, while also

overseeing linguistic accuracy. The sociologists played key roles in designing the interview guide, conducting interviews, and interpreting data, ensuring personal reflexivity was embedded in our group dynamics.

Interpersonal reflexivity, centered on the relationship between researcher and participants [46], was crucial to our approach. To reduce power asymmetries, sociologists, rather than the PI who was both a physician and an educator, conducted the interviews, promoting more balanced dialogues. We carefully managed geographical and linguistic challenges to avoid communication barriers, with reflexive writing practices (researcher memos, field notes) documenting these processes. Finally, we used self-interview techniques [26] to refine interview questions, address potential biases, and ensure linguistic clarity, thereby enhancing coherence across disciplinary perspectives.

**Analytical steps**

To explore the impact of the courses on students' medical education and professional identities, we used a constructivist grounded analytic approach, employing thematic analysis to understand and interpret our interview data [34]. Once all interviews had been transcribed, we used Nvivo12 to code each characteristic found within the text, developing categories inductively through a process of constant comparison [7]. The first round of line-by-line coding produced 70 initial codes. As most of the code labels were repetitive, we moved on to the second stage of analysis—drawing connections between codes. We constructed nine macro-categories. The third and final level of analysis involved selective coding, where all the previously coded categories were connected around one core category. The result of our analysis, which will be the focus of the following section, led to the identification of three main themes: 1) Enhancing psychosocial skills through comics; 2) Comics as a space for self-reflection; and 3) Building collective identity through comics. These sections together lead to the elaboration of the core category discussed later in our paper.

## Results

In our analysis of participant interviews, three main themes emerged regarding the role of comics in medical education.

### Enhancing psychosocial skills through comics

The first theme that emerged focused on how the use of comics enhanced observational, emotional, and reflective skills. The comics that students read in the various courses depict a wide variety of stories about health, illness, debilitation, and caregiving. Many of the stories depict interactions with the health care system from the patient's perspective, and some from the doctors' point of view. In either case, the students observe a variety of professional behaviors through the stories and characters, which serve as illustrative examples. Through the critical reading of such comics, students are given the opportunity to identify and examine these behaviors, and to engage in discussions about the congruence or discordance between the represented activities and their own evolving professional identities. This pedagogical approach facilitates the students' conceptualization of their aspirational identity within the medical profession. Particularly, students noted that reading and discussing comics in the classroom helped them to think as doctors in a variety of ways.

For example, participants suggested that comics fostered careful observation and self-reflection, behaviors that helped promote empathy toward patients.

*Comics can offer... can help to develop that skill of note, maybe what is not there, like what is being unsaid. And then, the empathy piece comes up a lot because, you know, we learn to be about hard science and to think of the body very clinically machine like often (student 12).*

*Sometimes we forget some aspects of this profession... reading some of the stories [in comics] reminded me that among our tasks is to have empathy with patients (student 4).*

Secondly, participants noted that examining comics in the classroom helped them understand and communicate uncomfortable emotions that arise when caring for patients.

*I think that using ... comics is just a great way of communicating so you can express complicated medical and scientific concepts. And you can also use it to convey maybe uncomfortable emotions or uncomfortable thoughts which students and people who practice medicine have (student 12).*

*Like, it really personified both patients and doctors for me and made me understand more every-*

*one's emotions, either when you get a diagnosis as a patient or when you're treating people for the first time, or when you don't feel very confident in a procedure like when you're in school, it's really easy to get wrapped up in trying to do everything perfectly and learning as much as possible (student 9).*

Thirdly, students indicated that reading and creating comics stimulated self-reflection about various challenges they faced during medical school and about their career path as they contemplated their transition into residency.

*It [comics-based course] was also a great way for me to compare myself with other colleagues on the choices we have made for our future careers (student 2).*

*It was a very good thing [comics-based course], the end of the fourth year when things start to be less busy and you're starting to transition. . . into residency. I think it was a good timing because ... it was not a lot of work and was interesting, and it was good to have right before transitioning into the resident (student 16).*

Fourthly, in addition to personal reflection, the use of comics helped to draw students' attention to wider social issues by challenging stereotypes and drawing attention to issues of social justice and inequality. Selecting a variety of comics that represent different aspects of medical practice, ethical dilemmas, patient experiences, and cultural perspectives provides a broad and inclusive view of medicine.

*I think graphic novels, you know, it's kind of a movement in its own right. But also, I think it ties in and can really be useful in a lot of the social justice movements that we've seen in terms of trying to address racial injustices, especially in medicine (student 10).*

*I also think there is a lot of value in having practitioners actually making comics themselves because I think it's a great outlet for self-reflection and problem solving your way through challenges. You kind of draw it out, and I think that type of introspection is something that practitioners need, clinicians need to do because culture of medicine can be extremely toxic. It's a very colonial, hetero, patriarchal, repressive, racist, sexist, sort of all these structures is really underpinned allopathic medical culture as it is right now (student 11).*

This first theme suggests that students valued comics-based classes both for their content—which provided compelling narratives about illness, caregiving,



and medical practice—and for their use of visual material, which facilitated unique forms of meaning-making. Some participants emphasized the value of storytelling for accurately depicting a range of professional behaviors, ethical dilemmas, and emotional challenges with patients. Others, however, highlighted the importance of visual aspects of comics, such as their ability to represent unspoken emotions, fragmented experiences, and non-verbal communication. This distinction raises an important point: the effectiveness of comics in medical education may lie in their dual ability to convey meaning through both through narrative and visual storytelling.

### Comics as a space for self-reflection

The second theme identified in the analysis was the role that comics played in promoting greater self-awareness and introspection, and how the classes created a safe space for such insights to be shared. In particular, students emphasized the introspective aspects of self-reflection that enables them to better understand their own emotions, identities, and personal challenges with medical training. Students noted that comics provided a means of self-exploration that helped them articulate and visualize their thoughts, struggles, and aspirations. The act of creating comics, in particular, appeared to facilitate this self-awareness, providing a structured yet creative outlet for students to process their evolving roles in medicine.

*Sometimes he [teacher] asked us to draw as we thought of ourselves as professionals... I don't know, at the beginning it was strange for me and I felt uncomfortable, but afterwards it helped me a lot because visualizing myself allowed me to understand myself more. I mean as if I were looking at a mirror! (student 11).*

*I think that I learned how to express myself in a new way and how to sort of piece things together and simplify things more (student 13).*

*The group discussion of some comics was particularly stimulating because it made me think about some aspects of my choice... I mean obviously I knew I wanted to be a doctor one day, but expressing this with my classmates really encouraged me (student 8).*

The comics courses also encouraged students to reflect on their personal behavior, including a new awareness of various paradoxes within the medical culture. For example, one student called out the “hypocrisy of medicine” that was present when students were expected to prescribe a healthy lifestyle to patients when it was not possible to follow their own advice. The process of making comics not only helped students to acknowledge such

paradoxes but was also seen as a “healthy way of coping” by providing an outlet to express moments of despair and to share experiences with others, thereby helping to mitigate burnout.

*In general, it provides an outlet for physicians and medical students to talk about what's happening to them, and I think being able to represent it visually is healing in a way and helps provide people with the relief of producing art, but also in sharing struggles and all the things that are happening in medicine. And it provides a level of reflection as well, because you must reflect on your experiences in order to create some comics (student 12).*

But the comics-based courses were more than an outlet for reflection—they were also described by students as safe spaces for processing difficult experiences.

*I think having that comic experience ... allowed me to kind of explore these emotions and experiences that I told you about .... It made me feel more comfortable kind of talking about these things ... with others. So, I think it helped with personal growth a lot as well (student 13).*

### Building collective identity with comics

The third theme that emerged focused on how comics contributed to the formation of a shared identity among healthcare professionals. In our analysis, the importance of this peer dimension emerged very strongly. While comics served as prompts for discussion and shared storytelling, the collaborative and participatory nature of the teaching sessions—particularly in small elective courses—appears to have been equally important. Students frequently described the value of exchanging perspectives with peers, and some of the quotes indicate that it was the open and interactive structure of the courses, rather than comics alone, that facilitated this sense of collective learning. Several students mentioned how participating in classroom discussions with peers helped expand their thinking in new ways. Stimulated by the comics-based material, students freely exchanged a wide range of ideas with each another, opening them up to new and different perspectives.

*I really enjoyed being able to absorb information in a way that's both illustration and words. And I think the discussions are really nice too, because I liked hearing my classmates' thoughts about how they interpreted things. And it was really interesting because a lot of times, things that stuck out to me were not the main things that stuck out to my peers in these stories. And so that was just the big takeaway for people (student 1).*

Students also expressed the importance of the peer relationships that developed in these courses, as these interactions reinforced professional values and norms.

*I really liked [group discussion] because it gave me time to discuss what was important to me. I already had a background in art and everything, therefore I was really helpful to my other classmates (student 2).*

Moreover, courses incorporating comics provided students with a supportive environment to engage with work-related norms, values, beliefs, and emotional resilience, offering opportunities for reflection and connection that facilitated their professional growth and transition from novice to expert.

*So, I wasn't intimidated by needing to or wanting to draw because I actually wanted to incorporate more of that back into my professional life. And in terms of how I heard about the course I got, it was because I've been rather burnt out in medicine and I was really [wanting] to incorporate more arts and humanities-based work into my medical career. So, I got to stumble upon graphic medicine as a concept myself (student 3).*

*I like that it was small and intimate. And you've got to hear from other colleagues, things I probably wouldn't have heard from in other courses (student 13).*

As medical students begin to seriously consider the attitudes, mindsets and responsibilities of doctors, they inevitably compare their preconceived notions about doctors with their real-life observations of them. In one of the Graphic Medicine courses, pre-clinical students have the opportunity to interact with more advanced students, giving them the opportunity to compare their expectations with reality.

*It was an environment for upper-level medical students to talk with lower-level medical students and they could ask questions. And it was like a type of mentorship. That was, I think, very useful as they were about to go into clinical rotations and providing a format for reflection for myself (student 4).*

## Discussion

Integrating comics into medical education is one of the newer ways that educators have used arts-based teaching to engage health professional students. This study is the first systematic approach attempting to understanding the experience of students who enrolled in elective comics-based classes during their medical training. Though our study included students across the US who enrolled

in a diverse offering of elective courses, their experiences had much in common, regardless of the specific texts that were read or the drawing activities that were assigned.

It is well known that medical education requires students to process vast amounts of complex information, and this can lead to cognitive overload. And, while the medium of comics offers an approach that can make complex content more digestible, in our study, comics were not typically used as a way to convey medical or scientific information. Rather, comics were more often used as a medium for addressing sensitive and emotionally charged topics in a non-threatening manner, thereby fostering various humanistic skills, promoting self-reflection, and helping to build collective identity. According to the students in our study, the combination of visual and narrative material fostered open discussions and encouraged deeper reflection on challenging ethical and professional issues. Beyond these cognitive and communicative benefits, the use of comics in the classroom also helped strengthen empathy, self-awareness, and intercultural sensitivity.

Through careful analysis of student interview data, the idea emerges that the use of comics in the classroom contributes to the formation of students' professional identity. Partly because of its centrality with regard to the cultivation of professionalism, scholars have increasingly focused their attention on the concept of professional identity formation (PIF), which is broadly concerned with the transition from layperson to physician [5, 9, 23, 35, 45]. Generally, PIF refers to both the process whereby students begin to define themselves as members of the medical profession [9] and to how existing personal identities (*who you are*) might shape personal and professional identities (*who you become*). This dual process can foster students' self-awareness of their role in the complex healthcare system, and help them to figure out how they should interact with different stakeholders such as patients, colleagues and caregivers [15, 22, 45].

Some scholars, such as Cruess and colleagues [9], have proposed that the primary goal of medical education be redefined as professional identity development, and argue for the expansion of specific educational strategies that support this new objective, such as exposure to challenging patient encounters, personal reflection through writing, "life-circle diagramming," and debriefing of experiences [6, 12, 17, 20, 36, 48]. In this context, medical educators have used graphic narratives, or comics, as a vehicle through which students can reflect on their emerging professional identities. When offered during the preclinical years, comics courses can facilitate the acquisition of both emotional and cognitive habits that become even more important during the clinical years. In a sense, such teaching provides the "emotional



equipment” to build the reflective capacity [42, 45] that students will need to manage their new responsibilities.

In this study, regardless of the content of the courses or teaching style, the acts of reading, discussing, and making comics contributed to the formation of the students’ emerging professional identities. Professional identity formation takes place when novices begin to “think, act and feel like a physician” [33] and occurs whether or not it is formally taught in the medical curriculum. However, it can be facilitated by a variety of intentional activities, and it appears that the use of comics is one way of facilitating the internalization of professional norms and values, as well as the rehearsal of appropriate professional behaviors.

Future doctors, though, are not supposed to simply “act like doctors” but rather to “become” doctors through a complex transitional process that incorporates various sense-making activities [10, 36]. However, this process can unearth tensions between students’ varied roles and identities [23], thus, self-awareness and reflexivity are crucial to manage this complicated developmental process. It is within this context that creative learning methods such as the use of comics can play an important role within the medical curriculum. As reported in Table 1, many of the group discussions stimulated by comics focus on the causes, symptoms, and narratives surrounding different medical conditions. Seeing the illness experience from multiple perspectives underscores competing narratives, reflecting the tension that students often feel about their own changing roles in the health care system. In some of the courses, students are asked to tell their own stories by creating comics. By using comics as a vehicle for articulating their personal and social roles, these courses offer students the opportunity to internalize the norms of their chosen profession in a critical way. Whether through reading or making comics, the use of this medium allows students to reflect on the contradictions in medical culture and to explore (and rehearse) their roles within this system.

Such claims evoke Edward T. Hall’s Cultural Iceberg Model [18] as an analogy for understanding the cultural codes that prevail in any society. Hall likened culture to an iceberg and proposed that it consists of two layers. He suggested that only about 10% of culture (the outer or surface layer) is immediately observable. Conversely, the vast majority—around 90%— (the internal or deep culture) remains hidden beneath the surface. Language, which includes both verbal and written forms, serves as a concrete mode of cultural expression.

Comics-based coursework provides a valuable opportunity for medical students to explore and reflect on the influential yet less visible aspects of medical culture and their evolving roles within the healthcare system.

By engaging with comics-based coursework, students uncover and critically examine the underlying values, beliefs, and practices that shape the medical profession but are often not immediately apparent. In addition, comics can reveal hidden and typically unaddressed aspects of the profession that are overlooked in traditional curricula, providing students with a broader and more nuanced understanding of their field. This visually rich form of expression provides students with an alternative means of communication, allowing them to articulate their thoughts and feelings in a variety of ways. It encourages them to question and reflect upon the taken-for-granted elements that are crucial to the formation of their professional identities, thus enriching their educational experience and personal growth.

### Limitation of this study

This research suggests several potential uses of comics within medical school. However, like all studies, it has limitations. First, there is a dearth of previous research on the topic, making it difficult to compare with other studies. Second, we used convenience sampling to identify participants, including individuals recruited from the annual Graphic Medicine conference. This recruitment strategy was chosen to ensure access to participants with relevant experience and insights into the application of comics in medical education and practice. However, this approach may have led to a selection bias, as attendees of this conference may have already possessed a favorable view of the use of comics in healthcare. Consequently, the respondents may not be fully representative of the broader target population. We attempted to mitigate selection bias by capturing a range of perspectives across institutions. Building on our exploratory work, future scholars might employ different sampling strategies, such as purposive sampling, which have the potential to mitigate such biases.

Third, the students enrolled in these courses may differ from the general student population, as all of the courses were electives and there may have been a self-selection bias in favor of those who were positively predisposed to narrative or arts-based learning methods. A fruitful area for future research would be to explore whether compulsory comics-based curricula are as well-received as the courses in our study population.

Finally, a potential limitation of this study is that courses in our sample were quite diverse, and we did not explore how the specific content and structure of the courses—such as the balance between comic consumption and production or the nature of the assigned readings—may have influenced students’ reactions and perceived benefits. To address this issue, we focused on identifying common themes across different curricula

rather than drawing conclusions about specific course structures. Future research could investigate the impact of these variables to better understand their role in shaping educational outcomes.

## Conclusions

This qualitative research investigated the role that comics-based courses can play in the medical school curriculum. Students enrolled in comics-based courses in medical school across North America find value in this mode of learning, and the use of comics contributes to the individual and collective professional identities of these emerging professionals. Our findings support further exploration of the multiple uses of comics in medical education.

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12909-025-07120-y>.

Supplementary Material 1.

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## Clinical trial number

Not applicable.

## Authors' contributions

Authors' contributions: Veronica Moretti: Methodology, Investigation, Writing—Original Draft, Data Curation, Visualization, Formal analysis. Alice Scavarda: Methodology, Investigation, Writing—Original Draft, Data Curation, Formal analysis. Michael J. Green: Conceptualization, Resources, Writing—Review & Editing, Supervision.

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## Data availability

The data (transcripts of interviews) available upon request.

## Declarations

### Ethics approval and consent to participate

The research proposal was submitted to the Human Subjects Protection Office at Penn State College of Medicine who determined that it met the criteria for exempt research according to Penn State policies and federal regulations. Informed consent was secured from all participants, and all interviews were conducted in accordance with relevant ethical regulations and guidelines.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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