

# A Narrative Inquiry into the Cultivation of Professional Identity Among Medical Students Through an Online Knowledge Community

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## Abstract

**Background:** Cultivating medical talents with professional identity is the ultimate goal of medical education. Nonetheless, the pre-service stage does not create sufficient opportunities to develop their professional identities. Also, there is a lack of long-term empirical data for this process. This longitudinal narrative study involved a dynamic online knowledge community in which students shared confusion, anxiety, and transformation about professional identity. Through capturing their reflections and interactions, the study explored how their professional identities developed over time through the online community in medical school and how this community best supported professional identity development.

**Method:** We collected data from chat records and telephone interviews, using the narrative inquiry method and its interpretative tools to analyze professional identity development. Quantitative analysis was carried out to reveal some influencing factors.

**Results:** Fine-grained analysis showed that medical students experienced a contextual change from individual identity to physician community and a collaborative process to create a supportive environment to develop a professional identity through multi-layered interactions. The analysis also identified that in a virtual community that formed group resonance, medical students balanced their self-identities and professional identity through changed perspectives to engage in self-reflection, with mentor coordination, blended interaction, and facilitating strategies as influencing factors. Our study uniquely presents online learning patterns and identity development trajectories.

**Conclusions:** The study complements the literature about online communities and the professional identity of medical students and has important implications for online informal learning.

**Keywords:** Professional Identity, Online Community, Medical Students, Narrative Inquiry, Informal Learning

## 1. Introduction

A new student completes medical school to become a professional doctor. It requires an adaptive development process, namely the process of identity formation, which happens at the individual level of psychological development and the collective level of personal socialization [1]. The task of medical education is not only to give medical students the best knowledge and skills but also to provide them with a professional identity, which is very important for them to “think, act and feel like a doctor” [2]. Professional identity is “a representation of self” in the process of internalizing the characteristics, values, and norms of the medical profession [3, 4]. It influences students to manage their relationships with teachers, patients, and hospital staff, and to know how to interact with each other in laboratories, classrooms, wards, and clinics [4]. Therefore, it enables students to build

their confidence in being a doctor. However, they have little opportunity to gain the environmental or institutional support to understand the responsibilities and values that the profession brings to them.

Regular studies have equipped medical education with synthesized educational theories and have presented theoretical models intending to possess a professional identity, such as a reframed medical education system, an experience-based learning model, and an amended Miller’s pyramid [4-6]. Compared to the medical education literature, learners’ narratives that support the objective of developing a professional identity remain important because such narratives are a part of broader longitudinal portfolios and fueled case studies of medical curricula [7, 8]. Yardley et al. (2020) conducted an

in-depth analysis of a large data set of interviews and found intertwined relationships between identity and responsibility in medical students' transition years [9]. Hatem and Halpin (2019) used a qualitative approach and concluded that medical students could take a step toward professional identity by writing reflections in the clinical year [10]. To date, studies have shown that narratives are a source of learning and reflection in the development of professional identity, especially during the internship phase. However, equivalent weight is not given to cultivating professional identity at different stages before students become skilled doctors, let alone sufficient attention to how communities facilitate students in preparing to be a doctor. Some forms of peer-learning or mentor-learning in an offline context are also apt to be influenced by many factors, such as institutional constraints, frequency of contact, and complicated interpersonal relationships.

As such, the expansion of an offline community into a less boundary-limited context, namely online communities, may be beneficial to promote the cultivation of professional identity among medical students. However, there are large gaps in the literature regarding whether or how students learn from online communities to adapt to the professional process of being a doctor, and how self-identities resonate with the group identity. Insight into the specific benefits of online communities in fostering professional identity could thus support students in preparing for their future career development, as well as clarifying the contributing factors that help students grow into doctors. By engaging in an online community, students collaborated with peers to increase their intrinsic interest, created new knowledge, and became flexible thinkers without being hindered by distance [11]. Participating in online communities is an opportunity for students to engage in reflection and professional growth and form supportive and reciprocal group norms [12, 13]. Managing the balance of work and family in an online community can also help ease the conflicts between professional and self-identities [14]. Although medical students give high ratings to online communities for improving the quality of medical education, the online participation rate may be high or low, and the impact of

online communities on the learning effect and identity change may also differ [15]. Little empirical work has explored ways to improve the efficiency of online communities in cultivating professional identities and increasing the participation rate.

This paper presents the results of a narrative study on the journeys of undergraduate medical students over 26 months to find support in cultivating their professional identity. It explored how professional identity—formed through knowledge exchange and reflection—interacts with medical students' actions across milieux over a long period, and the significance it provided for their professional identity formation. This exploratory research used an online community to follow the students in their journeys from their roles as medical students to newly qualified doctors. It documented their efforts to overcome identity conflicts to develop a professional identity, captured their reflections and interactions, and studied their growth and changes. By revealing their experiences, our study answers two research questions:

- (1) How does professional identity develop over time through the online knowledge community in medical school?
- (2) How can the longitudinal online community best support professional identity development for medical students?

## 2. Methods

### 2.1. Study Design

The present research explored diachronic changes in the cultivation of professional identity adopting the narrative inquiry research method. Professional identity development was revealed in three narrative stages from medical students to interns to newly qualified doctors (Table 1). Data were collected: (a) chat posting records throughout the three stages, and (b) telephone interviews in the third stage.

Chat posting records were used to capture medical students' reflections and interactions in the online community. Telephone interviews were used to (a) maintain and strengthen social relationships, (b) learn about their attitudes toward online knowledge communities, and (c) ask questions about their plans and feelings.

	Stage 1	Stage 2	Stage 3
Periods	Sep 2020 - June 2021	July 2021 - June 2022	July 2022 - Oct 2022
Identity	Medical students	Interns	Newly qualified doctors
Activities	Engaging in online exchange of challenges	Creating multi-layered interactions	Spreading new communities

**Table 1: Three Narrative Stages of the Online Knowledge Community**

### 2.2. Context and Participants

Our research followed ethics and institutional approvals. Because the study used an online community to follow the students in their journeys, it is necessary to share the narrative beginnings of this community. When the research started, the community members included senior students majoring in clinical medicine in a medical school and their mentor Dan whose research agenda was education. Dan had been 60 medical students' headteacher since they entered medical school. As a teacher of medical humanities, Dan noticed the neglect of professional values, actions, and aspirations in medical curricula, and began to

explore students' self-development in regular class meetings by sharing narrative stories of doctors' growth. Dan then established an online community using Tencent QQ, a popular messaging application used by 800 million people, to nurture continuous communication among these students. With Dan's permission, we invited all 60 students via email. A total of 58 students agreed to participate in the study, and their written informed consent was obtained. Guided by Dan, they interacted with peers by sharing experiences, proposed solutions to difficulties by drawing lessons from the experiences and focused on their internalized growth by finding their preferred ways to develop a professional

identity. According to participant approvals, their names were omitted to ensure participant anonymity; their identities were coded from No. 1 to No. 58.

### 2.3. Data Collection

The study was approved by the teaching commission and the school's institutional review board. Data collection occurred between September 2020 and October 2022, but periodic observations of community members continued until the end of 2022.

**Chat posting records:** We collected daily chat records from Tencent QQ over 26 months. Excluding videos, images, and memes, a total of 407,719 words were collected, calculated by the minute, and then coded by month to prepare for subsequent analysis and processing. We finally obtained 9,065 chat record items. The number of monthly “likes” was also collected as an ancillary reference to the chat history.

**Telephone interviews:** We conducted individual telephone interviews about participants' plans and feelings using semi-open questions. The key questions were: (a) What are you doing now to become a qualified doctor? (b) In what ways has our online community helped you become a doctor? (c) Will you plan to continue using online communities for professional development or further education? If so, how will you use them? After participants had granted permission for us to collect the audio data, all interviews were recorded and transcribed verbatim.

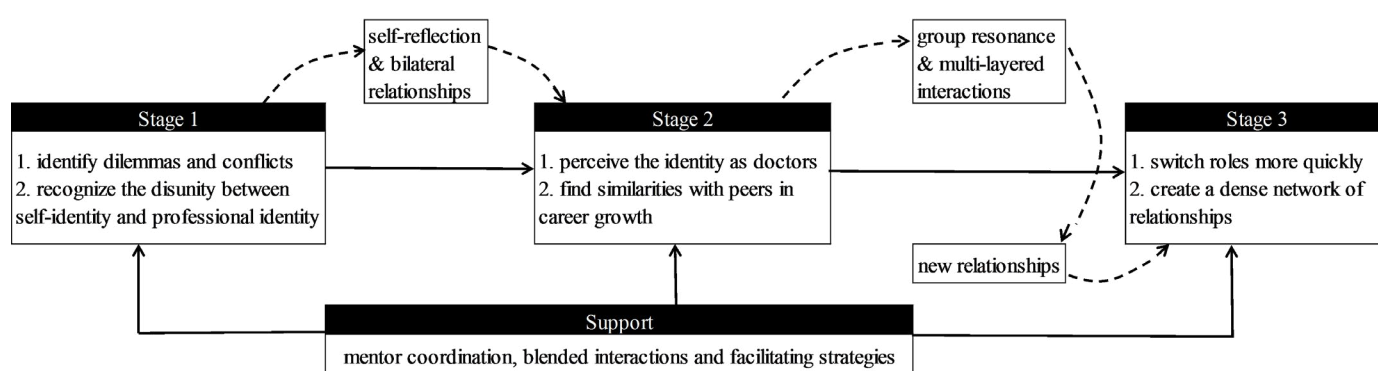
### 2.4. Data Analysis

First, we repeatedly explored the chat records and audio transcripts, which were collected and coded in month-by-month formats; drew up preliminary themes by adopting Clandinin and Huber's method of narrative inquiry—exploring experience stories, life needs, and personal emotions from three dimensions:

interaction (relationship between individuals and groups), continuity (learning experience from the past to the future), and situation (comparison of offline community and virtual community) [16]. Next, we repeatedly examined the mistakes and rationality of the analysis; negotiated the validity and accuracy of these preliminary themes; developed preliminary themes into the three thematic frameworks presented in the current paper; contacted the participants via email to ask for clarification and anonymous sources. Finally, we repeatedly reviewed the data and the previous literature; used the interpretation tools of the narrative inquiry method—restorying (revelation of participants' changes and the evolution of the online community) and layering (observation of the the multi-layered relationships among the members); integrated quantitative data to provide cross-sectional and longitudinal analyses [17]. Embedded in the tools is the use of metaphors to understand the profession and identities to explore more possibilities [18]. Trustworthiness was established through our negotiations and the rigor of the research process.

## 3. Results

Professional identity development in the online knowledge community (Fig. 1) is related to: a) how the identity developed from the individual student to the physician community over time, and b) how the evolution of the online community best supported the students' professional identity development. Not only did they experience identity conflicts and changes, but also the process of collaborating with peers to create a supportive environment to develop a professional identity. When constructing professional identity, they relied on individual reflection and group resonance. Bilateral relationships and multi-layered interaction played a role when they were working toward professional identity formation. Students benefited from new teacher-student relationships, mentor coordination, blended interactions, and facilitating strategies. Therefore, we determined three themes to answer our research questions as follows.



**Figure 1:** Professional Identity Development Through an Online Community

### 3.1. Constructing Professional Identity: Engaging in Self-reflection and Forming Group Resonance

The mentor played a critical role in guiding the students' self-reflection. Under his “bridge” role, students tried to deal with identity conflicts together to acquire knowledge that would be less available to them otherwise. In the self-reflection on

teamwork relationships, Student ID13 had a sense of belonging to his major but less experience with teamwork. He was confused about what kind of relationship to have with his teammates from other majors, such as partnership, competition, or a remain-unchanged relationship. The discussion may promote students' understanding of interdisciplinary teamwork.

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Excerpt 1: (2021-03-29, Chat records)

Student ID13: I took part in a research project, working with other medical majors.

Dan: What impressed you most?

Student ID13: I just didn't expect to work with people who were not majors of clinical medicine.

Dan: Does anybody have similar experience? Working with other majors?

Student ID26: The psychological drama "Blue Balloon" was performed by us from different majors. We've insisted on communication and made so many compromises...

When the students encountered value conflicts, they tended to reveal their self-identities. In the self-reflection on the learning purpose, Student ID28 seemed fatigued with his studies and reflected on the learning purpose. The knowledge and experience shared by the members made him feel inadequate and doubtful about his approaches and goals of studying medicine. The mentor's constant listening and timely responses provided suggestions and encouragement along their professional growth. The students found they could make bold "complaints" due to the anonymous feature of the community. "Come here to read" indicated that the online community garnered support from extended medical interpersonal networks, providing an alternative to professional identity formation.

Excerpt 2: (2021-06-07, Chat records)

Student ID28: I don't understand why you work so hard. Passing all the examinations and getting credits are my goals. Perhaps I am not as capable as you.

Dan: Lack of confidence is a stumbling block to becoming a doctor. Just getting a diploma is a betrayal of what you were meant to be. You still have a dream, don't you?

Student ID28: Yes, it's true. Perhaps I know why I often come here to read the messages. Some of you are excellent. I am just an ugly duckling.

Student ID49: Doctors are senior intellectuals who are the smartest. How can you be an ugly duckling? You are a swan.

The field texts show that the students refined knowledge by group resonance after they entered internship programs. They increasingly found that their journeys of professional growth were highly like those of their peers, and their perception of physician identity tended to be close to the social expectations of doctors. In the group resonance on the operating room experience, Student ID26 presented his recollection of the operating room experience as a point of inquiry to retell his learning. Other students tried to reconstruct coherent stories about the event, recalling knowledge about humanistic care and the medical behavior of the internship mentor. It triggered their views from the patient's perspective and their deep thinking on empathy and compassion from the doctor's perspective. Students began to believe in the significance of what they have been doing as an intern and reflect on how to think and act like a doctor.

Excerpt 3: (2021-10-27, Chat records)

Student ID26: ...At first, I thought all of them were just to keep the surgical requirements aseptic. Now I realized I had been neglecting the patient's feelings.

Student ID52: I am so envious that you have such deep thinking.

Student ID31: This is what we learned about "humanistic care".

Student ID26: I believe we can find opportunities for deep thinking in daily work.

Dan: This warm doctor-patient relationship is one of the concerns of general practice.

Student ID02: Sure. One impressive detail in my workplace learning was that my teacher always warmed the stethoscope before using it.

Student ID06: Really? It's a lot better than doctors showing their compassion for the patients.

When the students became newly qualified doctors, self-reflection and group resonance from the longitudinal online community made them easier to identify the people and things they wanted to devote their passion and energy to and to prepare to invest in them continuously. The students drew on the previous experience, switched roles more quickly and tended to enter the "generativity" stage of identity [19].

During my internship, I got into the habit of reading the messages to see what they were doing... Whether I am suitable to be a doctor is not the most important question for me. Being a good doctor is what I really want. (2022-08-18, telephone interview, Student ID07)

### **3.2. Working Toward Professional Identity Formation: Making Multilayered Interactions and Establishing New Relationships**

The students perceived reciprocity and similarity with other community members in the originating events. In Stage 1, most conversations were bilateral between the mentor and the students. Mentor coordination became an inducement for the dialogues. In discussing identity conflicts, Student ID07 faced a dilemma between his childhood dream of becoming a doctor and his inability to accept the loss of life. He tried to resolve this contradiction, seeking a way to gain courage and restore his confidence. After the mentor's comment, others offered tried solutions while one expressed similar confusion. Some students experienced the disunity between ideal physician identity and self-identity.

Excerpt 4: (2020-11-08, Chat records)

Student ID07: Back in my childhood, doing experiments was my lifelong dream, but every time I ... it struggled so violently ... I realized my dream was not cool but cruel.

Dan: We'll find its significance later, because we can't experiment on humans in such cases.

Later, the students were used to the growth opportunities provided by the community and were more willing to be a seeker or a giver of information. The students paid attention to their peers' internship stories and responded to or empathized with what they shared with hindsight. They gradually developed multi-layered interactions. Although this trigger story took place at a different time, Student ID21 was very likely to be influenced by the previous discussion about the operating room. He not only recalled his observation of his teacher's medical behavior but also reinterpreted the responsibilities of doctors. He even



used the metaphor of the “patron saint” to interpret the persona of doctors, showing his anticipation for the job. The interactions took place in different dimensions – language, time, and space, and the teacher-student relationships were no longer bilateral but multi-level.

When inserting a gastric tube into ..., my teacher paused and comforted him several times. I did not think too much at that moment. But later when ... I suddenly had a feeling: in the face of disease and pain, the doctor should be the patron saint of patients. Patient’s feelings should also be considered. (2021-12-13, Chat records, Student ID21)

In Stage 3, medical students seemed less anxious about their professional identity and knew how to use online communities to further professional growth. They lacked continuous motivation to stay in the current community and spread online communities to create a dense network of relationships to develop a professional identity. The students took the initiative to search for online communities to discuss clinical practice issues. They tried to build multi-level relationships with others in new communities by leveraging the experience of multi-layered interactions. Using terms such as “getting a response” or “communicate” suggested that the students were often pretty sure that what they wanted from an online community was knowledge accumulation conducive to professional growth. Students became active learners in this non-competitive environment.

... I’ve learned to communicate with Dan, but you know, I usually do not initiate any contact with teachers ... it’s interesting that everyone in the group has their own learning perspectives and experiences. I got a response from them ... Now I’m in an online

group including ... I’ll try to communicate with them in a similar fashion. (2022-09-16, telephone interview, Student ID34)

### 3.3. Best Supporting Professional Identity Development: Blended Interactions, Facilitating Strategies, and Mentor Coordination

First, blended interaction is needed so that online chatting and offline meetings enhance members’ trust and feelings of belonging. Face-to-face discussions were frequent before students graduated from medical school, which guaranteed members’ social-emotional information exchanges and pro-social behaviors [20, 21]. In the study, having fewer offline contacts reduced the desire to communicate, which became more apparent when students formally entered the workforce, as shown in Figure 2. Offline meetings are beneficial and supplemental because the online community is affiliated with and an extension of classroom informal teaching. Blended interaction thus contributes to the smooth development of the online community and further enriches the members’ activities and engagement.

Second, the data reveals that facilitating strategies, including task provision and recognition from others, are beneficial in sustaining the community [22]. By providing tasks, the number of records reached 788 and 706, which were the two highest points in the two-year establishment of the community (Fig. 2): (a) discussion of work scenarios when students moved to hospitals, and (b) discussion about back-to-school arrangements. Some students won recognition because they elicited many likes from others: Student ID26 uploaded a video of their psychological drama “Blue Balloon”, and Student ID44 filmed a vlog experimenting.

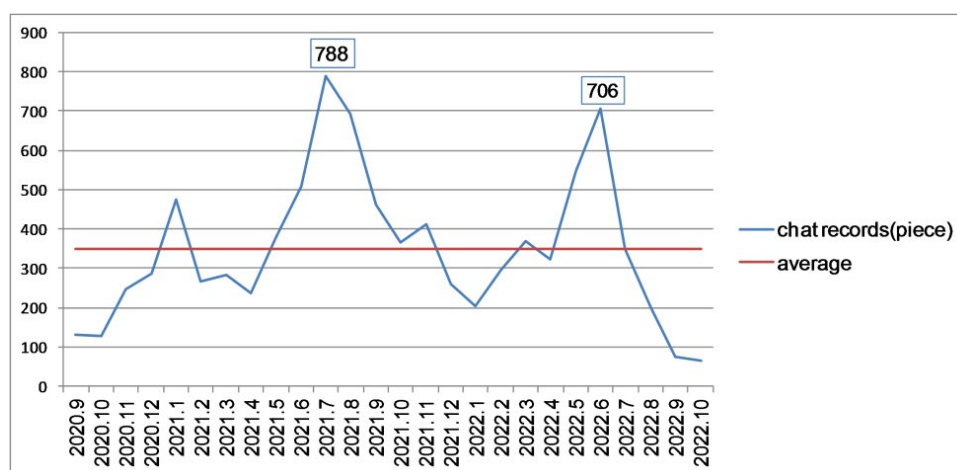


Figure 2: Monthly Chat Records with Two Peaks

Third, mentor coordination is vital in the community. At the beginning of its establishment, the mentor was the headteacher, who had frequent contact with the students. Most of the conversations were between mentor and students, which laid the foundation for further communication. The mentor’s role as a “bridge” ensured the dialogues proceeded smoothly, which is obvious in Stage 1.

## 4. Discussion

Three narrative stages revealed how professional identity developed in the online community. In Stage 1, participants preparing to become interns were confused and experienced anxiety about what it takes to be a doctor, which inspired them to find others with similar aspirations and experiences. Knowledge sharing nurtured collaboration and helped to uncover experiential knowledge, socializing them into their professional

identity at the collective level [4, 23]. In Stage 2, the interns' explicit and tacit knowledge—recorded knowledge, workplace knowledge, learning experience, observations, and treatment stories—was shared. Talks or descriptions of this knowledge could be valuable for community members and help them think about what kind of doctors they would be [24, 25]. Professional identity continued to develop with the comments and responses they received. Students' reactions to others' feedback reflected how they understood themselves and their current environment. Professional identity developed in their constant reflection and self-adjustment. In Stage 3, the students became newly qualified doctors. The online community was increasingly characterized by diffusion and weak ties as they adapted to their current identity. They relied less on the community and expanded their social circles to acquire more knowledge by integrating into new communities. Although it was no longer a knowledge center, such informal learning helped students to develop their professional identity with a carry-over effect [25].

Medical students experience identity changes and achieve different understandings in online communities, whether facing identity conflicts, becoming more socialized as interns, or seeking carry-over effects of professional growth. When students involved in medical courses engage in corresponding network groups, it is not uncommon for them to keep silent or ask for routine knowledge transactions rather than knowledge sharing, not to mention social-emotional information exchange [21]. In this particular study, the online community provided a narrative space—a miniature of time and space—for members to exchange knowledge anonymously with others who wanted privacy but were willing to share their experiences and reflection. It was a safe place that allowed for the group resonance of members' ongoing experiences and for various responses to produce reciprocity and refine knowledge. Students' interaction promoted to create a multi-level relationship and a secondary discourse whose impact on students was a dynamic process to stimulate professional identity formation [26].

This study confirms that the prominent characteristics of online communities in shaping group culture and creating a supportive network environment have significant benefits in promoting professional identity formation. Previous studies have focused more on specific approaches to cultivating professional identity. However, our current findings highlight that the students can maintain a relational space with a reciprocal and caring attitude [27]. Students may overcome some barriers because sometimes talking openly or in detail about oneself in public is too direct and too explicit. In an unconstrained space, community members preferred anonymity to evade some influences. They discussed their difficulties and bewilderment online without being questioned about their learning attitudes and working abilities; they also vented negative feelings without being criticized. In Student ID28's case, if he complained to others that the medical students around him worked too hard, they might question his (lack of) commitment to the medical profession. The data also provide evidence that the students were more likely to have a sense of professional belonging in becoming cooperative learners and more likely to adapt to their identities as doctors. A possible explanation is that strengthening social relationships

influences an individual's willingness to continue participating in the community [28]. Therefore, medical educators and stakeholders in the computer field should collaborate to design an appropriate environment that reduces many barriers, helps students display hidden identities to face identity conflicts, and allows them to reconstruct professional identities.

The results also suggest that, when solving identity conflicts and accompanying peers in the professional journey, many students tend to change perspectives, expanding their focus from themselves to others' difficulties and gains. The change from self-reflection to group resonance may help students achieve more authentic understandings. Interestingly, the emergence of group resonance demonstrated that although the members expanded their focus, they did not expect to exchange emotional support with one another to seek "empathy" or "appreciation" [29]. Most sought professional development by constructing and refining knowledge and strove to find their places in the medical culture. The findings show that multi-level relationships can motivate students to identify and analyze problems exposed in professional identity development. This problem awareness is deeply related to the dilemma and process of professional growth [30]. For this reason, it is beneficial for medical students to see their working and learning experiences changing over time and space in the chat logs, and these experiences can interact with their own, which may contribute to professional identity formation. These findings add to the broader literature on professional identity. The current work can be a basis for studying the identity transformation of medical students and the practice in community-based medical education.

The fine-grained analysis reveals the interaction between individuals and the community group. Individuals in the community had their own will and freedom of choice, kept to their own beliefs, and had their expectations of becoming doctors. Meanwhile, their self-identities were linked to the world of others, including the knowledge offered to others and the obligation of peer support. These self-identities gradually merged into the professional identity that the whole group developed. This process is a contextual change of identity from individual medical students to the physician community, which Hogg and White (1995) considered a process of "deindividuation" [31]. The data also show that students were more likely to acquire social perceptions of doctors by resonating with one another, joining or creating other communities conducive to professional identity formation. Student ID13 thus finally took the initiative to cooperate with other majors, and Student ID28 realized how important his dream was and that he was now on the road to becoming a "swan." An individual's professional identity develops dynamically to balance self-identity and social identity. The evolution of the online community witnessed and facilitated this effort. The findings can help to clarify the reasons for individual differences and identity integration in medical students' professional identity formation.

Our study revealed several factors contributing to developing a professional identity in the online community. Offline meetings are beneficial and supplemental because the online community is affiliated with and an extension of regular teaching. Blended

interaction guaranteed members' social-emotional information exchanges and pro-social behaviors, thus contributing to the smooth development of the online community [20, 21]. Facilitating strategies, including task provision and recognition from others, are beneficial in sustaining the community [22]. Strengthening interaction to motivate knowledge contribution is essential for professional identity formation. It reinforced teacher-student relationships and helped the online community sustain itself in a healthy and friendly way. Mentor coordination motivates the vitality of the community and is an inducement for dialogues between others. The students may imitate the cultural ecology of the current community when they expand to other knowledge communities.

## 5. Limitations

The limitations of this study include the uncertainty of reporting on specific participants and the small number of participants. We attempted to develop a new approach to cultivate the professional identity among medical students, but the need for anonymity of the members in this approach partially limited the study. As a result, the study is open to criticism for not having a large number of participants. Future research could explore the use of other collaborative techniques or different ways of creating a knowledge community, or it could continue to track the progress of individual cases to broaden the understanding of how to make online knowledge communities more effective. In addition, to develop an online community in a short period, the community was created and guided by the students' trusted headteacher. In this case, we avoided conflicts and constraints that the school environment might bring, so the students were free from the complexity of the social environment. Further research could consider the possibility of transferring the positive characteristics of group resonance and multi-layered interaction to classroom teaching or school contexts, so the study of online knowledge communities could be broadened and deepened to promote greater effectiveness in professional identity formation.

## 6. Conclusions

The current teaching innovation aimed to develop the professional identity of medical students using an online knowledge community instead of a traditional approach to learning in courses on medical professionalism. The teaching innovation that we proposed may make a unique contribution to the research on the identity transformation of medical students and the practice of community-based medical education. It provides a novel approach for sustaining a relational space to assist professional identity formation, fostering new teacher-student relationships, and making it possible for identity transformation from identifying conflicts to switching roles more quickly. The current findings are based on the cultivation of professional identity by the interaction between individuals and groups that should enable students to engage in the process from self-reflection to group resonance, which may provide a bridge for identity development between knowledge acquisition and practical work. More importantly, the professional identity developed in the medical community may indirectly influence the students to establish good interactions with healthcare professionals and good doctor-patient relationships in future circumstances, and to take future actions consistent with their

identity as doctors.

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## Competing Interests

The authors declare that they have no competing interests in relation to the subject of this study.

## Availability of Data and Materials

Due to conditions on participant consent and other ethical restrictions, the datasets used and analyzed in the current study are not publicly available. If you have any database data requirements, please contact the corresponding author of this study.

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