'Introduction to Taking Care' Clerkship at the Degree in Medicine & Surgery Programme in Orbassano (University of Torino): Results From the Sentiment Analysis of the Logbooks

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ABSTRACT

Results From Sentiment Analysis of the Logbooks of the 'Introduction to Taking Care' Clerkship

Introduction: aim of the paper is to present results from the logbooks written by the first-year students of the Degree Programme in Medicine and Surgery in Orbassano (University of Torino), taking part to the IPE clerkship *'Introduction to taking care'*.

Methods: sentiment analysis using R programme-

Results: body contact and communication give the greater contribution to the negative emotions detected throughout the

logbooks, while Advance Medical Simulation Centre (AMSC) and opinion show a higher prevalence of positive sentiments. A text analysis based on the relationships between words, show a relationship between medical and nursing students, professional figures and patients.

Conslusions*: AMSC is the protected setting in which students became more confident with basilar manouvres and its attendance should be implemented in the whole degree programme.

Data for body contact and communication suggest that a training in these soft skills should be implemented.

Keywords: Interprofessional education - Sentiment analysis - Logbook - Early clinical exposure

Introduction

Interprofessional Education (IPE) is a learning process that prepares health professionals through field experiences enabling learners to work in collaboration with the community and various segments of society, in order to read and respond to multifaceted needs of the population[1].

This training method is based on a holistic view of human needs that transcends the usual boundaries of individual disciplines, exposing learners to complex situations in order to develop in them the ability to collaborate with individuals or groups who express a different perspective with respect to the problem in study[2].

The aim of the IPE is therefore to create multidisciplinary groups of health professionals who help the population to achieve the best possible level of health[3].

Since the 1980s this approach has been used in Anglo-Saxon countries with different objectives, ranging from strengthening collaborative competence[4] to improving services[5], to introducing a holistic approach to health problems[6].

According to Barnett[7] the IPE has several functions:

1. Practice: Connecting learning to real life
2. Epistemological: promoting the development of critical thinking, which overcomes the 'preconceptions' related to the role and professional practice
3. Pedagogical: encourage cooperation between teachers from various fields, in order to expose the student to a wide range of training strategies
4. Rationale: overcoming the reasoning limited to a particular aspect to develop a broader reasoning.

In summary, IPE is the process whereby two or more professions learn with, from and about each of them with the aim of improving collaboration and the quality of care[8]. This approach is in line with the guidelines taken by the Degree Program in Medicine and Surgery in Orbassano (University of Torino) which provides student-centered, oriented towards community needs learning and benefits from early exposure to clinical practice in a protected learning environment (PLE).

Aim of the paper is to present results from the logbooks written by the first-year students of the Degree Program in Medicine and Surgery in Orbassano (University of Torino), taking part to the IPE clerkship *'Introduction to taking care'*.

Methods

Students

1st year MD students in tandem with 3rd year nursing students (Academic Year 2021-2022). At the teaching location, students were supported by 3rd year nursing students, who acted as peer coaches, under the supervision of a clinical tutor.

Expected learning outcomes

1. Ability to practicing a venipuncture and female urinary catheterization in the correct way according to an expert's observation
2. Ability of checking arterial blood pressure
3. Soft skills as being conscious of one'a future role, being able to communicate with peers and tutors
4. Ability to identify further educational need basing of the experience of the clerkship

Clerkship delivery

ADVANCED MEDICAL SIMULATION CENTRE (AMSC)

Before attending the wards, students trained on some basic skills like moving patients confined to bed, checking arterial pressure and vital signs, practicing a venipuncture and female urinary catheterization in the AMSC in tandem with 3rd year nursing students and under the supervision of a clinical tutor. Students, divided in small groups, attended the AMSC for 5 afternoons during the spring 2022.

WARDS

Various wards were involved in this clerkship. Students, divided into small groups, attended the ward for 1 day during the spring 2022.

Briefing and debriefing session before and after the AMSC and wards session were offered in order to explain respectively the scheduled activities and to reconceptualize the experience done.

Assessment

At the end of the clerkship, student submitted a logbook exploring five areas:

1. experience in AMSC;
2. therapeutic environment and professional rules;
3. personal experience of contact with the patient's body;

4. communication with the patient and family;
5. students' opinion

Data extraction

Logbooks were downloaded from the Moodle platform of the course as document files containing the text. Files format were doc, docx, pages, pdf and txt. The data extraction was automated using software R version 4.1.2[9] and the textreadr[10] package. One corrupted file was excluded from the analysis. The final dataset was made by 72 logbooks.

Text processing and data analysis

The text was lowercased and tokenized on whitespace to create unigrams, i.e., single words. Stopwords, which are frequent occurring that may be irrelevant in natural language processing, like "the", "of" etc, and numbers were removed from the analysis. Stopwords were pulled from onix, SMART and snowball lexicon[11].

We conducted a sentiment analysis to approach the emotional content of the students' logbooks. To analyze the sentiment, we considered the text as a combination of individual words and their emotional intent to infer whether a section of text had a positive or negative sentiment or perhaps was characterized by more nuanced emotions.

We used the BING lexicon[12] of pre-established positive and negative words to assign each of the words a numerical sentiment value, either +1 (positive sentiment) or −1 (negative sentiment). Then we computed a net sentiment (positive - negative) by summing up the number of positive and the number of negative words across the text.

Afterwards, we used the NRC Emotion lexicon[13] to assign each of the words an emotion, either anger, or anticipation, or disgust, or fear, or joy, or sadness, or surprise, or trust. We did not use the NRC Emotion lexicon to categorize words into positive and negative categories, as it usually overestimates the positive sentiment[14].

We performed a bigram analysis, i.e., we tokenized the text into two consecutive sequences of words, called bigrams, and then we built a model of the relationships between them. A bigram can be considered as an individual words in a text. The most common (important) bigrams were identified computing for each bigram the inverse document frequency, which decreases the weight for commonly used bigrams and increases for bigrams that are not used very much. Inverse document frequency was then combined with term frequency, obtaining a measure of the frequency of a term adjusted for how rarely it is used, which is called tf-idf.

Finally, we examined how often sentiment associated words were preceded by "not". For this analysis, we used the AFINN lexicon[15], which gives a numeric value for each word, with positive or negative numbers indicating the direction of the sentiment. To understand which words contributed most to the wrong direction of the net sentiment, the number of times they appeared was multiplied by their sentiment score.

Results

72 out of 73 student logbooks were successfully imported. Overall, 46 (64%) of the students were females. In Table 1 a description of the wards attended by the students is reported.

	Overall
n	72
sex = M (%)	26 (36.1)
ward (%)	
Cardiology	7 (9.7)
General surgery	9 (12.5)
Geriatrics	7 (9.7)
Internal Medicine	6 (8.3)
Internal Medicine 1	3 (4.2)
Internal Medicine 2	5 (6.9)
MRF	7 (9.7)
Neurology	7 (9.7)
Orthopedics and thoracic surgery	6 (8.3)
Pneumology	8 (11.1)
Urology	7 (9.7)

Tab. 1. Descriptive of the hospital wards attended by the students

They include all the key wards for inpatient care at S. Luigi Gonzaga University Hospital.

Fig. 1 shows the most common words stratified by logbook sections.

For AMSC the most common words are linked to the basic skills the students were trained in. For body contact with the patient the most cited words relate to the discom-
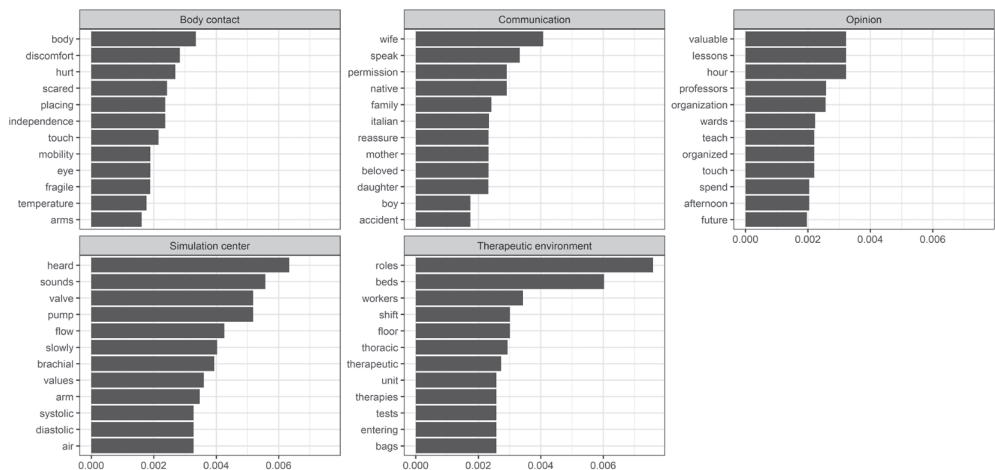

Fig. 1.

fort in the first experience in body touch, probably related to the fear of hurting the patient. Regarding communication at least 3 items can be highlighted: obtaining the permission from patient, the relatives to communicate with, possible limitations due to the use of Italian. Experience of the therapeutic environment is mainly focused on professional roles. In general, the opinion seems to be positive (valuable) in relation with both the AMSC and the wards.

In Fig. 2 we plotted the net sentiment scores across the student logbooks.
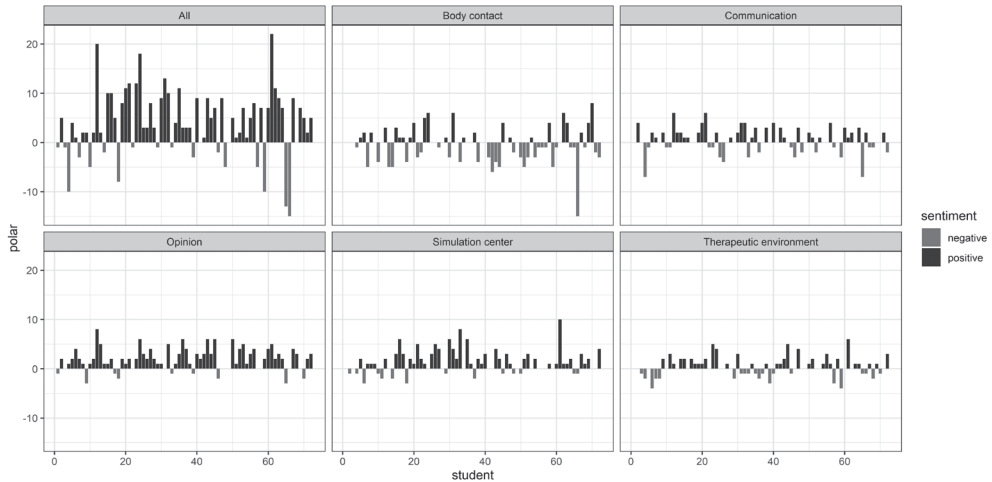
Fig. 2.

Light grey bars correspond to students who expressed more negative than positive emotions. Body contact and communication give the greater contribution to the negative emotions detected throughout the logbooks, while AMSC and opinion show a higher prevalence of positive sentiments, as it can be easily read in Table 2.

	level	Overall	Body contact	Communication	Opinion	Simulation center	Therapeutic environment
n		320	65	64	65	64	62
sentiment (%)	negative	96 (30.0)	32 (49.2)	20 (31.2)	9 (13.8)	14 (21.9)	21 (33.9)
	positive	224 (70.0)	33 (50.8)	44 (68.8)	56 (86.2)	50 (78.1)	41 (66.1)

Tab. 2. Students reporting an overall positive or negative net sentiment

Opinion and Simulation center are in fact the sections with fewer students that expressed negative net sentiments, 14% and 31%, respectively. Higher and more frequent negative net sentiment is encountered in Body contact text section.

The most common positive and negative words stratified by text sections are reported in Fig. 3.
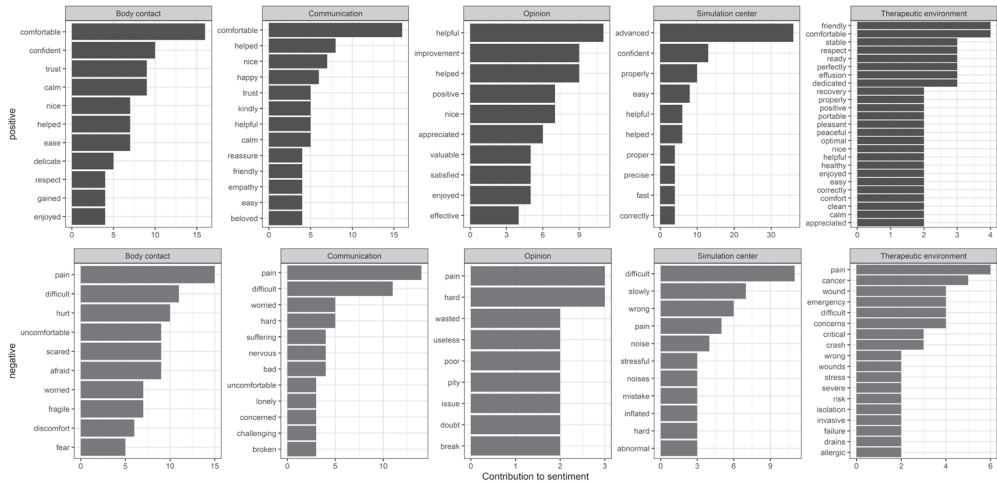
Fig. 3.

Most positive word in Simulation center section are "properly" and "helped", again relating to the basic skills training and to the help received from peers.

Most negative words in Body contact section are "hurt", "pain", "difficult", "scared", "afraid" suggesting that the negative net sentiment could be mainly due to the students' fear to hurt fragile patients during their first experience of body contact.

Again, in the Opinion section positive sentiments are prevalent: "improvement", "help" and "satisfied" are frequently reported words.

In Fig. 4 the most common words belonging to each sentiment within the logbook are shown.
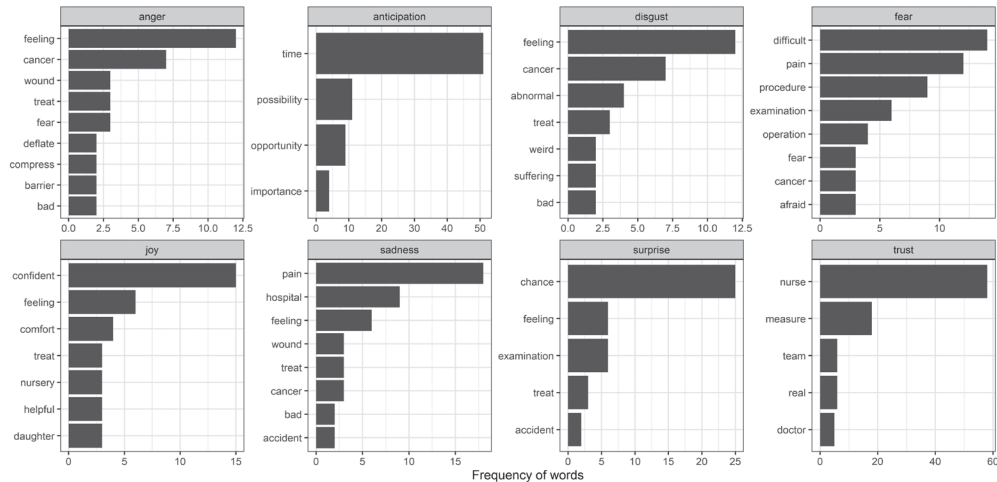

Fig. 4.

These assignments of words point out a sentiment of trust associated to words that include "nurse", "doctor", while words related to fear sentiment include "operation",

Fig. 5.

Fig. 6.

"procedure", suggesting this sentiment was common to students when facing patients' contact.

Fig. 5 shows the results of a text analysis based on the relationships between words, i.e., which words tend to follow others, or tend to co-occur within the same logbook. Two relevant items emerge: the first is the relationship between medical and nursing students, professional figures and patients, the second is related to the basilar manoeuvres and skills the students were expected to train in.

Fig. 6 shows the words preceded by "not" which contribute to the sentiment in the inverse direction. The bigrams "not hurt", "not alone", "not afraid", "not worry" were overwhelmingly the largest causes of misidentification, making the text seem more negative than it is.

Discussion

The pedagogical project

The 'Introduction to taking care' project is characterized by the key principles of medical education[16]: an active student-centered pedagogical approach, focused on the health needs of individuals and of the community, using tools such as discovery learning, problem based learning, working in small groups as well as experience in a PPE (AMSC and hospital's wards).

The delivery is made more effective by the IPE approach, as it is recognized in international literature[3,8].

The assessment tool, the logbook, is widely used in undergraduate and postgraduate courses[5,17,18], and offers a room for reflection on the course taken and on one's own experience, to make them further learning and growth opportunities.

Our results support this interpretation, particularly in the AMSC, body contact and communication sections; in fact, as said before, the most positive words in Simulation center section relate to the basic skills training and to the help received from peers and tutors.

Most negative words in Body contact section suggest that the negative net sentiment could be mainly due to the students' fear to hurt fragile patients during their first experience of body contact.

Again, in the Opinion section positive sentiments are prevalent: "improvement", "help" and "satisfied" are frequently reported words.

All the words indicate that a reflection on patient body, on fundamental skills and on the role of peers and tutors has taken place and that consequently the experience has been internalized and re-conceptualized.

The logbooks' analysis

Results of logbook analysis can be discussed in the light of the expected learning outcomes.

Findings of the sentiment analysis and of the texts analysis show that student practiced the basic manoeuvres such as checking arterial blood pressure or practicing a venipuncture, while female urinary catheterization was not cited by the students. Positive sentiments related to AMSC support the hypothesis that student became more confident with these manoeuvres in a protected professional environment, taking advantage of the presence of peer coaches and tutors. A reflection on professional roles seems to have taken place too: in the texts analysis the term medical students co-occur with nursing student, nurse, doctor and patient, suggesting that the need for a multidisciplinary approach in order to improve patient health outcomes was perceived.

On the other hand, students are worried by body contact with the patients, and by communication with them and their relatives. Even if students are at first year and still have some trouble in communicate in Italian, body contact and communication emerge of central skills students must be trained on in a deeper way, cumulating further experience and reflection.

Finally, it must be pointed out that ability to identify further educational need basing of the experience of the clerkship does not emerge explicitly from the sentiment and text analysis.

Originality of the paper derives from a set of elements: using a logbook as an assessment tool for an early clinical exposure in a setting of interprofessional educational and performing a sentiment and text analysis on the logbooks. To our knowledge, at least at national level, there are no publications based on this set of key elements: logbook are used in medicine and surgery degree programs in Italy but a textual analysis has not been conducted since now.

Weaknesses of the project are the brevity of the clinical experience and the post hoc evaluation alone, both due to organizational limits in the post Covid phase.

Conclusions

Logbook was a useful tool both for students, to reflect and internalize their experience and for teachers, to assess if the main learning objectives were reached.

AMSC is the protected setting in which students became more confident with basilar manoeuvres and its attendance should be implemented in the whole degree course, in order to improve the confidence with diagnostic and therapeutic interventions.

A general negative feeling emerges for body contact and communication, suggesting that a training in these soft skills should be carried out throughout the years of the course, with different degrees of depth, following a specific pedagogical projection.

The Authors would like to conclude the paper with a phrase from a logbook

> *Communicating with patients and their relatives came out to be more difficult than I expected. Wearing a white coat in a ward exposes me to many attentions from patients and families I was not prepared to receive.*

At first, I had some difficulties in communicating while trying to appear as professional as I could. Then, I acquired more experience, and everything became easier, even though I still have to learn a lot, especially in terms of empathy.

Additionally, many patients in the neurology ward typically have difficulties in speech, and this made it harder for me to communicate with them; however, I also understood that body language, facial expressions, hand gestures and physical contact are powerful tools for transmitting thoughts and feelings, as much as words are.

Bibliography and Notes

1. Pitt R, Interprofessional Education: What, How & When? CAIPE Bulletin Nos1997;13.
2. Knapp M, Paths to Partnership: University and Community as Learners in Interprofessional Education. New York, NY: Rowman and Littlefield Publishers Inc.; 1998.
3. World Health Organization. Framework for action on interprofessional education & collaborative practice.
4. Barr H, Competent to collaborate: Towards a competency-based model for interprofessional education. Journal of Interprofessional Care 1998;12:181-187.
5. Wilcock P & Headrick L, Continuous quality improvement in health professions education. Journal of Interprofessional Care 2000;14.
6. Gyamarti G, The Teaching of the Professions: An Interdisciplinary Approach. Higher Education Review 1986;18:33-43.
7. Barnett R, The Idea of Higher Education. Bristol: Open University Press; 1990.
8. Barr H, Interprofessional education: today, yesterday and tomorrow: A review. UK: Learning and Teaching Support Network for Health Sciences and Practice, Centre for Health Sciences and Practice; 2002.

9. R Core Team. R: A Language and Environment for Statistical Computing. 2021.
10. Rinker T, Goodrich B & Kurkiewicz D, Textreadr: Read Text Documents into R. 2021.
11. Various lexicons for English stop words. https://search.r-project.org/CRAN/refmans/tidytext/html/stop_words.html.
12. Zhang L & Liu B, Sentiment Analysis and Opinion Mining. In: Encyclopedia of Machine Learning and Data Mining. US: Springer; 2017. doi:10.1007/978-1-4899-7687-1_907.
13. Mohammad S & Turney P, Emotions Evoked by Common Words and Phrases: Using Mechanical Turk to Create an Emotion Lexicon. In: Proceedings of the NAACL HLT 2010 Workshop on Computational Approaches to Analysis and Generation of Emotion in Text 26-34 (Association for Computational Linguistics, 2010).
14. Silge J & Robinson D, Text Mining with R: A Tidy Approach. Sebastopol, California: O'Reilly Media; 2017.
15. Nielsen FÅ, A new ANEW: Evaluation of a word list for sentiment analysis in micro-blogs. Preprint at https://doi.org/10.48550/arXiv.1103.2903 (2011).
16. Guilbert JJ, Educational handbook for health personnel. https://apps.who.int/iris/handle/10665/42118 (1998).
17. Amin Z, Chong Y S & Khoo H E, Practical Guide to Medical Student Assessment. World Scientific Publishing Company; 2006.
18. Patil NG & Lee P, Interactive logbooks for medical students: are they useful? Med Educ 2002;36:672-677.