

Towards Portrait [(Auto) Ethnography, Narrative, and Action Research] of Bioinformatics

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Abstract

A bioinformaticist often interacts with many professionals and work on multiple projects at the same time; hence, highly social. Qualitative portrayal approaches; such as action research, ethnography, and narratives; have been employed in healthcare education and practices but limited in bioinformatics. In this article, I review 12 portraits in healthcare education and practices and argue that there are both intrinsic and extrinsic benefits for bioinformaticist to engage in portrayals of the field. Publication is the main extrinsic benefit. The main intrinsic benefit comes from learning and consolidating past experiences, forming a launch pad into the future. I conclude by listing 6 directions in which a bioinformaticist can embark on.

Keywords: Contextual Richness; Education; Research; Practice; Interactions; Professional Portraits

The Storied Person

The Universe is made of stories, not of atoms.

– From “The Speed of Darkness” by Muriel Rukeyser

Our love for stories may be our common human experience since antiquity regardless of our age. From a child listening to bedtime stories, to listening to our teachers’ and professors’ life experiences, to describing our own experiences to students; we have never deviated very far from this central theme; be it on our beds, in class gatherings, across the lecture hall, or over a mug of beer or coffee. Each of us is made up of stories and very often, bridges between different persons are built on mutual sharing of stories [1,2].

A reason why stories are powerful communication tools is that stories puts the person into context and paints a portrait in the process, something that statistic is unable to do [3]. Good stories result in oxytocin secretion [4], leading to empathetic responses [5]. Lin., *et al.* [6] demonstrated that subjects whom received intranasal oxytocin donated more money to more causes, and reported greater concern for persons portrayed in public service announcements, compared to placebo.

Narrative approach and ethnographic approach are deemed by Creswell [7] as suitable approaches to storytelling as both emphasized on rich emotions [8,9] required to describe the human experience [10]. A story, also known as a portrait, is useful for weaving in the contextual background of a personal journey [11]. The main difference lies in the focus [7] – narrative focuses on the individual while ethnography focuses on the cultural context. Personal narration also overlaps with participatory action research where reflective self-inquiry is carried out with the intention to improve subsequent actions [11-14]. Hence; narration, ethnography, and action research; are various emphasis on a portrait.

A bioinformaticist is essentially a problem solver [15]. It is common for the bioinformaticist to be working on several projects simultaneously. Moreover, a bioinformaticist can originate from different academic backgrounds [16,17] – most commonly, biology, statistics, computer/information sciences, or even various engineering fields [18]; each with their own distinct ways of working [19] and vocabularies. Bartlett, *et al.* [20] reported that current life science is highly dependent on bioinformatics; yet, bioinformatics is taken for granted, largely uncredited, overlooked, or its legitimacy questioned. Hence, there are various tensions in the field [16,17,19,20]. Thus, bioinformatics provides a fertile ground for portrayals as social examination into bioinformatics is relatively limited. In this article, I review several recent portrayals in biomedical education and research to illustrate the potential benefits it has on bioinformatics. In this era of “publish or perish” [21,22], I argue that bioinformaticists should engage in portrayal studies as a means of self-reflection on the way we educate and mentor new generation of bioinformaticists, how we interact with and benefit various stakeholders.

Portraits of Education and Practice

Action research [23], narrative [24], and ethnography [25] have been shown to be important in medical education. Clandinin, *et al.* [24] use Connelly and Clandinin’s definition of narrative inquiry [26] (“*People shape their daily lives by stories of who they and others are and as they interpret their past in terms of these stories. Story, in the current idiom, is a portal through which a person enters the world and by which their experience of the world is interpreted and made personally meaningful*”) and find that narratives are instrumental in professional identity formation among medical learners. Moch, *et al.* [23] reviewed 80 articles on action research in nursing education and defined action research in nursing as “*a systematic research process that can be articulated by the researcher, involving data collection and analysis as well as reflection and discussion with coresearchers or others for the purpose of making change in a situation over time*”. This is consistent with the views of various authors [11-14] that the central focus of action research is to examine the impact of a change - the action [27]. Goodson, *et al.* [25] uses Creswell’s definition of ethnography [7] where the purpose of ethnography is to study the setting, and concludes that ethnography can provide a rich collection of information that can be used to identify variables for further studies, or understanding the behaviors between various participants.

To illustrate the impact of these approaches, I summarize several recent portrayal articles:

1. Simmons [28] explored the role of ethnography in sexual education; especially sexually transmitted diseases (STDs), such as HIV; among Zimbabwean traditional healers. He found that the healer’s basic explanatory model for infectious diseases is consistent with the larger explanatory model where infectious diseases are caused by polluting agents. However, the healers subscribe to an etiological model that is incommensurate with current biomedical models. This suggests that health promotion should consider the commonalities between the healer’s base model and current biomedical models, such as, STDs are spread by sexual intercourse and behavioral changes is the root of prevention. Traditional healers use “African injections” to treat STDs and propose that this concept can be basis for current medical treatments.
2. Powell, *et al.* [29] established a multimedia online patient narrative archive, including audio-visuals of patients and narratives of educators, from a convenient sample of patients undergoing physiotherapy; and the educational benefits of this archive was evaluated by physiotherapy students. The main benefit reported by the students is the humanizing of the cases as a student reported that they “*had a real person, not just a case study on a sheet of paper*”. Both educators and students acknowledge increase empathy as the patient’s voice are being heard. Culturally sensitive areas, such as voluntary euthanasia, was introduced by the patient and provides a window for class discussion, which will not be elaborated upon without the patient’s initial admission.
3. Johna, *et al.* [30] published an article to remind medical educators on the power of narration by weaving in 3 narratives by physicians in training, including a narrative of how the attending physician (the mentor) did not practice what he/she taught, and present narratives as important case to illustrate empathy in patient-physician relationships.

4. Ng, *et al.* [31] used institutional ethnography to examine the gaps in special education for children with chronic health conditions or disabilities. Institutional ethnography was developed by Dorothy Smith [32] to study social interactions within the context of social institution; such as, a school or a marriage. Work processes were mapped out visually to identify disjunctions between expectations and actual processes. A clear disjunction identified is the flow of recommendations from clinicians to and within the school system. This was not explicitly defined in writing but clear through the lens of institutional ethnography, which allowed clinicians to craft better recommendations.
5. Fowler, *et al.* [33] reported the involvement of 9 nursing students in a participatory action research aiming at educating parents manage their young children's digital devices usage. The first cycle aimed at identifying the needs to inform the second cycle and the nursing students were impressed with the parents' commitment to the learning and wellbeing of their children, and willingness to provide information about their device usage. The second cycle was a workshop aimed at developing the necessary skills required by the nursing students to implement a program catering to the needs of the parents. The third and final cycle was the actual implementation of the program. Evaluation by the nursing students revealed an ownership of the program and the students gained substantial confidence to talk to strangers. However, the effectiveness of the implemented program was not in the scope of this report.
6. Nelson, *et al.* [34] reported a 4-year multi-site multi-method ethnographic study promoting open communication in sexual and reproductive health between adolescence and adults in Bolivia, Nicaragua and Ecuador; with the intention for future promotion of parent-to-teens. 71 semi-structured and unstructured in-depth interviews, 35 participant ethnography, and 46 peer group discussions were carried out. The authors found that trust is more important than open communication and there are differences in trust within generations and between generations. As a result, it may be possible that increasing open communication, which is the goal of many intervention programs, suffered a pushback due to the lack of corresponding trust.
7. Khorasani, *et al.* [35] reported on a participatory action research project led by 800 nurses with an average of 8 years of nursing experience, aiming at patient education in Iran. The driving purpose was to develop patient education skills in Iranian nurses as the needs for patient education was not met in Iran. Two years after the program, the percentage of educator-nurses and educator-nurses to patients ratio increased up to 5 times in the wards. At the same time, patients' satisfaction with discharge education increased. This demonstrated that action research can benefit all parties.
8. Abey, *et al.* [36] reported an action research project involving 66 clinical podiatrist as placement mentors for podiatry students at a British university, with the intent to identify factors impacting podiatrists' decision to serve as clinical educators. Four factors; protected mentorship time, clinical educator relationship with university, sign-off responsibility, and volunteer status; were identified as predictors (adjusted r^2 of 0.428) for podiatrists' decision to serve as clinical educators.
9. Pentiado, *et al.* [37] presented a case narrative from the voice of a medical student (JAMP) facing the mother of a newborn with Patau syndrome (also known as Trisomy 13) and multiple malformations diagnosed at birth. The mother's and the reported family support changed the JAMP's initial negative emotions of fear, hopelessness, and rejection; to one of support, love, and empathy. JAMP described how the witnessing of maternal love helped him/her overcame feeling of eugenics and rejection, and enabled him/her to understand the meaning of love and the value of life.
10. Kalateh Sadati, *et al.* [38] examined patients' view on the qualities of a great physician by gathering data from 156 clinical consultations, 920 hours of participant observations, and 6 focus groups with patients and their relatives, in an educational hospital in Iran. It was found that there was asymmetrical power distribution in favour of the physician and several patients reported various aspects of patient objectifying by the physicians. However, patients ranked physicians whom are kind, friendly, empathetic, and a good listener, as great physicians. Thus, showing that the humanistic aspects and good communication skills are as important as medical skills for a physician.

11. Ng, *et al.* [39] study the education of healthcare professionals through the lens of institutional ethnography. The authors found that policies and culture within an institution are able to explain problems and phenomenon that are related to individual actions but unable to be fully explained at the individual level. Thus, showing that various social constructs add different levels of abstraction to individual actions.
12. Mendonca, *et al.* [41] reported an action research in Brazil on education of older adults by primary care professionals. Evaluation was performed 120 days into the education program. It was found that aging is not a homogenous process for every adult but a personalized process with many different peculiarities; hence, appropriate measures should be catered for different cases. Increased respect for older adults and acknowledging their autonomy are crucial factors to improve the relationship between professionals and older adults, which can in turn lead to greater self-care and adherence to treatment and management regimes.

From the 12 portraits above, a set of common themes emerged – (1) humans are beings with feelings, thoughts, and emotions; and had to be considered as such, rather than names or identification numbers on case records; (2) humans are social beings with interactions between each other and with their external environments, including cultural and social norms. Taken together, these studies demonstrate that portrayal studies can be used to elucidate the social aspects of scientific education and practice, which can be useful tools to nurture the next generation of scientists.

Towards the Portraying of Bioinformatics

Being a problem solver [15] and potentially working on multiple projects simultaneously, bioinformatics is as much a social endeavor as a scientific one. It is common for a bioinformaticist to be interacting with more professionals on a daily basis than a laboratory scientist. For example, when I was a research associate in South Dakota State University, I had to (1) correspond via email with collaborating laboratory scientists, (2) assist my supervisor in graduate mentoring, (3) communicate with high-performance computing support in the university, (4) seek advice from faculties from other institutions and members in various mailing lists, and (5) advise faculties and graduate students from other departments on their bioinformatics needs; all at the same time. Hence, I believe that a bioinformaticist has a rich scientific portrait.

However, before I can advocate the portraying of bioinformatics, I must answer a practical question – publications aside, is there an intrinsic/autistic advantage in producing portraits? As I worked on my first such portrait [41], a scene from *Sex and the City* (Season 5 Episode 7 – The Big Journey) popped into my mind – where Carrie Bradshaw met up with Mr. Big after her book reading and Mr. Big told Carrie, “*I had no idea I hurt you so much. I got to say it was tough seeing it in print Not all in one sitting, one reading, one right after another, bam... bam... bam...*” The same happened to my head as these events [41] were scattered across more than a thousand pages of my diary and I had to simplify and put them into a structure as I put the events in writing; thereby, enabling me to see themes across various stories; which had been therapeutic for me. It made me realize why I did what I was doing. Hence, I will encourage such an endeavor as it is no longer merely an act of professional communication but also an act of self-consolidation – coming to terms with various aspects of my previous work, and processing dispersed information into knowledge; thereby, forming a checkpoint and a new launch pad into the future.

If convinced that this is an endeavor worth an attempt, we are then faced with the operation question – what can we portray? I will leave this article with a several directions:

- Reflect on one or more projects and look for common themes [41], which has been shown to have important health benefits [42].
- Reflect on the culture of a research group [43], an institution [44], or a particular sub-field of bioinformatics within an institution [44].
- Reflect on different stages of your career and examine how various events had shaped you [45].

- Reflect on several research groups or institutions that you had worked with, and find commonalities and differences between their cultures [46].
- Reflect on past positive and negative mentoring experiences as mentor and mentee [48,49].
- Reflect on the role of a specific piece of instrument, software tool, or scientific interest, and explore its change over time [50].

Conflict of Interest

No conflict of interest.

Bibliography

1. Baskerville D. "Developing cohesion and building positive relationships through storytelling in a culturally diverse New Zealand classroom". *Teaching and Teacher Education* 27.1 (2011): 107-115.
2. Hansen CD., et al. "Storytelling: An instrument for understanding the dynamics of corporate relationships". *Human Relations* 46.12 (1993): 1391-1409.
3. Newman TB. "The Power of Stories over Statistics". *British Medical Journal* 327.7429 (2003): 1424-1427.
4. Marshall Jessica. "Gripped: why stories are so compelling". *New Scientist* 209.2799 (2011): 45-47.
5. Luo S., et al. "The oxytocinergic system modulates sadistic context-dependent empathy in humans". *Scientific Reports* 7 (2017): 12463.
6. Lin PY., et al. "Oxytocin increases the influence of public service advertisements". *PLoS ONE* 8.2 (2013): e56934.
7. Creswell JW. "Qualitative inquiry and research design: Choosing among five approaches, 2nd edition". Sage Publications (2007).
8. Ellis C., et al. "Autoethnography: An overview". *Qualitative Social Research* 12.1 (2010): 10.
9. Edwards SL. "The personal narrative of a nurse". *Journal of Holistic Nursing* 34.2 (2015): 154-161.
10. Ingraham C. "The scope and autonomy of personal narrative". *Written Communication* 34.1 (2016): 54-74.
11. Ling MHT. "The bioinformaticist's/computational biologist's laboratory". *MOJ Proteomics and Bioinformatics* 3.1 (2016): 00075.
12. Baum F., et al. "Participatory action research". *Journal of Epidemiology and Community Health* 60.10 (2006): 854-857.
13. Apgar JM., et al. "Identifying opportunities to improve governance of aquatic agricultural systems through participatory action research". *Ecology and Society* 22.1 (2017): 9.
14. Darby S. "Making space for co-produced research "impact": learning from a participatory action research case study". *Area* 49.2 (2017): 230-237.
15. Ling MHT. "Problem-based learning (PBL), an important paradigm for bioinformatics education". *MOJ Proteomics and Bioinformatics* 5.4 (2017): 00166.
16. Lewis J., et al. "Inscribing a discipline: Tensions in the field of bioinformatics". *New Genetics and Society* 32.3 (2013): 243-263.
17. Bartlett A., et al. "Generations of interdisciplinarity in bioinformatics". *New Genetics and Society* 35.2 (2016): 186-209.
18. Wu H., et al. "Customizing bioinformatics graduate programs for diversified student backgrounds". *Frontiers in Education Conference (FIE), IEEE* (2016).

19. Lewis J., *et al.* "Hidden in the middle: Culture, value and reward in bioinformatics". *Minerva* 54.4 (2016): 471-490.
20. Bartlett A., *et al.* "Bioinformatics: indispensable, yet hidden in plain sight?" *BMC Bioinformatics* 18.1 (2017): 311.
21. Tian M., *et al.* "Perish or publish in China: Pressures on young Chinese scholars to publish in internationally indexed journals". *Publications* 4.2 (2016): 9.
22. Pho PD., *et al.* "Obstacles to Scholarly Publishing in the Social Sciences and Humanities: A Case Study of Vietnamese Scholars". *Publications* 4.3 (2016): 19.
23. Moch SD., *et al.* "Use of action research in nursing education". *Nursing Research and Practice* (2016): 8749167.
24. Clandinin DJ., *et al.* "Narrative inquiry: a relational research methodology for medical education". *Medical Education* 51.1 (2017): 89-96.
25. Goodson L., *et al.* "An overview of ethnography in healthcare and medical education research". *Journal of Educational Evaluation for Health Professions* 8 (2011): 4.
26. Connelly FM., *et al.* "Narrative Inquiry". In: Green J, Camili G, Elmore P (eds.) *Handbook of Complementary Methods in Education Research*. Mahwah, NJ: Lawrence Erlbaum (2006): 375-385.
27. Badger TG. "Action research, change and methodological rigour". *Journal of Nursing Management* 8.4 (2000): 201-207.
28. Simmons D. "The role of ethnography in STI and HIV/AIDS education and promotion with traditional healers in Zimbabwe". *Health Promotion International* 26.4 (2011): 476-483.
29. Powell S., *et al.* "An online narrative archive of patient experiences to support the education of physiotherapy and social work students in north east England: An evaluation study". *Education for Health* 26.1 (2013): 25-31.
30. Johna S., *et al.* "The power of reflective writing: Narrative medicine and medical education". *The Permanente Journal* 17.4 (2013): 84-85.
31. Ng S., *et al.* "An institutional ethnography inquiry of health care work in special education: A research protocol". *International Journal of Integrated Care* 13 (2013): e033.
32. Smith DE. "Institutional ethnography: A sociology for people". Rowman Altamira (2005).
33. Fowler C., *et al.* "Participatory action research: Involving students in parent education". *Nursing Education in Practice* 14.1 (2014): 76-81.
34. Nelson E., *et al.* "The unintended consequences of sex education: an ethnography of a development intervention in Latin America". *Anthropology and Medicine* 21.2 (2014): 189-201.
35. Khorasani P., *et al.* "Nurse-led Action research project for expanding nurses' role in patient education in Iran: Process, structure, and outcomes". *Iranian Journal of Nursing and Midwifery Research* 20.3 (2015): 387-397.
36. Abey S., *et al.* "Identifying factors which enhance capacity to engage in clinical education among podiatry practitioners: An action research project". *Journal of Foot and Ankle Research* 8 (2015): 66.
37. Pentiado J., *et al.* "Love and the value of life in health care: A narrative medicine case study in medical education". *The Permanente Journal* 20.2 (2016): 98-102.

38. Kalateh Sadati A., *et al.* "From good to great physician: a critical ethnography based on patients' views". *Journal of Medical Ethics and History of Medicine* 9 (2016): 18.
39. Ng SL., *et al.* "Blurring the boundaries: using institutional ethnography to inquire into health professions education and practice". *Medical Education* 51.1 (2017): 51-60.
40. Mendonca F., *et al.* "Health education with older adults: Action research with primary care professionals". *Revista Brasileira de Enfermagem* 70.4 (2017): 792-799.
41. Ling MHT. "A Personal Narrative of 6 Pre-University Research Projects Over 7 Years (2009-2015) Yielding 19 Manuscripts". *MOJ Proteomics and Bioinformatics* 6.3 (2017): 00193.
42. Pennebaker JW., *et al.* "Forming a story: The health benefits of narrative". *Journal of Clinical Psychology* 55.10 (1999): 1243-1254.
43. Stephens N., *et al.* "Doing laboratory ethnography: reflections on method in scientific workplaces". *Qualitative Research* 17.2 (2017): 202-216.
44. Platt J., *et al.* "Producing ethnographies: workplace ethnographies in history". *Journal of the Histories of the Behavioral Sciences* 49.1 (2013): 45-62.
45. Myers N. "Ethnography of pedagogy and visual cultures in contemporary structural biology". PhD Thesis. Massachusetts Institute of Technology (2007).
46. Roizman B. "The maturation of a scientist: An autobiography". *Annual Reviews of Virology* 2.1 (2015): 1-23.
47. Molley L., *et al.* "Shared worlds: multi-sited ethnography and nursing research". *Nurse Researcher* 24.4 (2017): 22-26.
48. Stanley CA. "Mentoring minority graduate students: A West Indian narrative". *New Directions for Teaching and Learning* 1994.57 (1994): 121-125.
49. Kitchen J. "Looking backward, moving forward: Understanding my narrative as a teacher educator". *Studying Teacher Education* 1.1 (2005): 17-30.
50. Jensen T., *et al.* "Whey protein stories - An experiment in writing a multidisciplinary biography". *Appetite* 107 (2016): 285-294.

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