Review of: "Generating Smart Goals of Engineering Education Institutes in the Fast-Developing Countries"

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Dear Thanikachalam Vedhathiri,

I was delighted to have the opportunity to read this paper titled "Generating Smart Goals of Engineering Education Institutes in the Fast-Developing Countries". Looking at the comments to another review for this paper, I understood this paper will be developed further based on the review statements, so hopefully this review will provide you with some food for thought.

 To give some details on where I am coming from, I received my PhD in International Business and since 2014 I have been involved with multidisciplinary education (business, engineering, design disciplines). In addition, I have done some pedagogical research in multidisciplinary contexts. Although in the past I have worked in the faculty of civil engineering, I am not an engineer myself. With this in mind, I am now moving on to the actual review.

On a minor note, maybe "Smart" in the title should be capitalized (i.e. "SMART") since it is an acronym. When I first read the manuscript, I wrote down "not defined?", but then I realized smart refers to SMART.

Most importantly, however, two things came to my mind once I had finished reading the manuscript: 1) what is the main narrative of this paper?, and 2) how might the readers engage with the paper? For example, the introduction section felt a bit rushed as it did not seem to describe the context nor the problem in great detail. By the same token, I was expecting the introduction, at least briefly, to discuss how the paper contributes to prior literature. In fact, is this a paper about developing higher education institutions (HEIs) in Indian context or is the focus on program development, for example? Higher Education journal (https://www.springer.com/journal/10734), for instance, might have relevant references if the focus of this paper is more on developing institutions. Similarly, Journal of Engineering Education (https://onlinelibrary.wiley.com/journal/21689830) might also be a good reference point.

With the above, I would like to draw attention to a stronger engagement with prior literature. For example, this was published in Higher Education in 2018: https://link.springer.com/article/10.1007/s10734-018-0343-1 and this one in Journal of Engineering Education: https://onlinelibrary.wiley.com/doi/10.1002/j.2168-9830.2008.tb00988.x. To me, both papers seem quite relevant, and by positioning the paper in the introduction, it would become clearer to the reader what the paper is all about.

Furthermore, there are many interesting points put forth in the paper, and at times I also thought there was quite a lot

going on. From a reader's point of view, I often felt lost because I was not sure why certain aspects / concepts were introduced. For example, Table 1 was quite busy and I was wondering how the "qualitative analysis" was carried out. It would be great to see how the analysis was conducted. In terms of the contents of this table, my reading of it was that there should be more emphasis on industry-driven educational goals? This is completely fine but at the same time I would also argue that educational goals should also be crafted based on what *could* be. Following industry's needs only would most likely serve short-term goals and there is also an interesting conundrum here in the sense that industry-driven goals are probably grounded in a specific point in time, whereas it will take a couple of years for the students to graduate. To what extent such goals are still relevant in the future? In a way, I think the paper would benefit from a deeper engagement with the complexities inherent in goal formulation.

Section 1.3., however, presents some rather speculative and somewhat unsupported claims. For example, to what extent can we say that "Setting high-performing goals" enables people to work towards a shared goal? Or can we really say that such goals create "satisfaction and further intrinsic motivation"? Looking at HEIs in 2023, one could also say that we are aggressively measuring and quantifying everything, but for what purposes? What is the impact here? For instance, in management and organization studies there are emerging discussions on why such rational approaches are actually harming HEIs and students as too much emphasis on metrics shifts attention away from everything else. For quantification, Espeland and Stevens' article might be inspirational: https://www.cambridge.org/core/journals/european-journal-of-sociology-archives-europeennes-de-sociologie/article/sociology-of-quantification/53D563E0E4A75A05E877B27C06E957F9

Similarly, I was not certain what section 1.4. is trying to do. In fact, I often found myself asking this question – "what is this section trying to do?" – since the paper seems to present many ideas, but often in a somewhat superficial manner. This points to the issues I mentioned earlier here: what is the story of this paper? This paper definitely has a lot of potential, and it would be great to emphasize depth instead of breadth.

II. Literature Survey was quite challenging to read and I was also unsure how and why the selected institutions were chosen. Seen from a different perspective, is this really a literature review? I was expecting the paper to engage with prior studies instead of listing institutions and how their goals look like. While interesting, maybe this section could be condensed and merged with introduction to show why we should pay more attention to educational goals?

By the same token, it was not clear why section 2.1. was separate from the discussion above.

Furthermore, it would be great to see in section 2.2. how the initiatives have been synthesized. As it is now, it is difficult for the reader to see who did the synthesis, how, and for what purposes.

Based on section "III. Objectives of Research", one way to rethink the paper would be to show what we already know about educational goals in HEIs and how this paper contributes to such discussions. This could form the basic / foundational idea of the paper, and then all the other sections could be mapped based on this framing. For instance, ask yourself "how does this section further the paper's objectives?".

Section on the sample was somewhat misleading as the paper talks about the Indian context yet only four states were

chosen. This decision should be justified clearly and similarly I would love to see more details of the participants. Granted, section 3.1. contains such information, but how does this sample allow to make claims regarding educational goals? This is not critique, mind you, I just would like to see a justification for matching the sample with the paper's goals.

Presenting the survey findings was somewhat peculiar since some of the questions seemed to formed so that they would generate yes / no answers, yet the options were "Excellent", "Very good", "Good", "Fair", "Poor". For instance, 3.2.1.: "Whether your institution has introduced multidisciplinary programs?" – how can we interpret "Excellent" in this context? If the options were defined for the reader, this should be included in the paper. Otherwise it is difficult for the reader to see the connections between the options and the presented findings.

All in all, there are many interesting things presented in the paper, but it also feels the main contributions are convoluted because of the complexity. I would suggest starting with 2-3 contributions and then see how the paper can be structured around those. Some sections might be removed, while others added, to ensure the main contributions stand out. This, then, would help the readers better engage with the paper.

Minor notes:

- "The government of India has prepared…" – this paragraph seems to be missing references.
- "Defining institutional goals as helps…" – or educational goals? Was not sure because previous sentences were talking about educational goals
- "Since 1947, it is understood…" – does this year refer to independence? If so, it would be great to be more explicit about it.
- "…have introduced industry-specific undergraduate programs." <- do we need them?
- "This low percentage indicates that previous National Policies of Education…" – instead of making this assumption, why not read these policy documents to see what they mention about multidisciplinarity?