
TVET engineering students' perceptions of the value of their qualification and the prospects of employment

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ABSTRACT

The study described in this article explored the ways in which selected technical and vocational education and training (TVET) engineering students perceived their qualifications and employment prospects, given the youth unemployment rate in general and, in particular, that among TVET graduates. While the unemployment rate among South Africans with a tertiary qualification stood at 7%, it appeared to be a staggering 33% among TVET graduates in 2017. In order to gather data from a sample of TVET engineering students, a self-administered qualitative questionnaire was used to collect data from two colleges. A total of 113 TVET engineering students at the two colleges completed the questionnaire. The gender profile of the participants was 64 females and 49 males, who were all between the ages of 18 and 29 years. The findings showed that the TVET engineering qualification does not guarantee employment because of the lack of jobs in the South African economy. Moreover, the participants perceived unemployment as a function of job scarcity rather than of a lack of skills. However, some participants perceived a TVET engineering qualification to be in demand, and this demand is attributed to the electricity crisis/load-shedding in South Africa. The majority of the 79 participants, who perceived unemployment to be an economic crisis, recommended that a solution to unemployment should be to make voluntary service compulsory in both the public and the private sector. To this end, the government should make available funding for small, medium and micro enterprises (SMMEs) and also encourage and fund students to study beyond their undergraduate qualification. As an entry-level requirement for employment, experience is seen as an unfair practice and a barrier to entry for graduates.

KEYWORDS

Empowerment, TVET engineering qualification, skills, unemployment, youths

Background and context

Technical and vocational education and training (TVET) is seen globally as central to political reforms and social justice initiatives that target unemployment and economic development (Powell, 2014). Kraak (2018) has argued that, worldwide, TVET colleges are linked to globalisation, intermediary skills for human development and employability patterns that focus on the relevance of skills to labour market needs. In many African countries, governments emphasise and recognise the critical role of TVET in skills development and preparing young people for the future world of work (Afeti, 2018). However, in South Africa, despite the major changes that have occurred in the TVET sector since the emergence of the democratic dispensation in 1994, unemployment seems to be continually on the rise (Akoojee, McGrath & Visser, 2008). Moreover, in 2017, while the unemployment rate among South Africans with a tertiary qualification stood at about 7%, it was a staggering 33% among TVET graduates, some of whom have engineering qualifications (Prinsloo, 2011; Nkosi, 2017; Statistics South Africa, 2017). Statistics South Africa (2017) acknowledges that the level of unemployment among university graduates appears to be low compared to that of TVET graduates. Nkosi (2017) asserts that in South Africa the chances of a TVET graduate being unemployed are very high.

A study that evaluated the placement and employability of TVET graduates who had been part of the Work Integrated Learning (WIL) Programme in the Safety and Security Sector from 2015/16 to 2017/18 confirmed that TVET graduates are still finding it difficult to find employment, despite having experienced workplace learning (SASSETA, 2018:22). In 2011/12, there were about 600 000 unemployed graduates in South Africa, a third of whom were TVET engineering and science graduates (Prinsloo, 2011; Sharp, 2015). While thousands of other young South African graduates of various tertiary and post-school education institutions face the challenge of unemployment, TVET graduates may feel particular disappointment, since successive governments have placed hope in the role of TVET in developing skills for employment (Prinsloo, 2011; Nkosi, 2017). Prinsloo (2011) argues that although engineering and science graduates, especially those from TVET institutions, are given knowledge and some practical training, the majority of these students lack the necessary experience and training, ultimately leaving them unemployable and unemployed. The literature also seems to suggest that TVET colleges have limited equipment for practical training and a shortage of workshops for practical or technical skills training for students; their students therefore lack the technical expertise and industrial experience needed to meet the expectations of industry (Papier, 2017). As a consequence, these graduates require additional mentoring and supervision once they are employed (Papier, 2017; Legg-Jack, 2018).

This study was therefore conducted in an attempt to explore and understand TVET engineering students' perceptions of the value of their qualifications and their prospects of employment. Soliciting their views is critical, given that the frequent narratives or reports and the literature in general on unemployment and its causes tend to ignore the voices and

perceptions of students about their qualifications and employment prospects. Moreover, since unemployment in South Africa is prevalent among graduates, obtaining their views is critical to shaping public policy. The study employs the education and employment linkage (EEL) as a conceptual framework that informs and shapes it.

Research objectives

The research aimed to explore the ways in which TVET engineering students perceive the (dis)connections between their course programmes and their prospects of finding work. In addition, the study aimed to understand the reasons for their perceptions, in relation to youth unemployment.

Conceptual framework

The study is based on the concept of education–employment linkage (EEL) in TVET programmes (Rageth & Renold, 2019). According to this concept, when players from education and employment systems share authority over a particular TVET programme, the EEL is highest. Bolli, Caves, Renold and Buerger (2018) maintain that linkage is related to the participation of youths in the labour force. Moreover, Bolli, Egg and Rageth (2017) indicate that TVET programmes that enable or require students to spend at least 25% of their time in the workplace causally improve youth labour market outcomes, particularly in overall employment. In contrast, those programmes that enable or require students to spend less time in the workplace do not improve those outcomes for students.

Rageth and Renold (2019) identify three ideal models for linkages in TVET programmes. The first considers that power is typically shared in high-linkage networks. The other two models are low-linkage scenarios in which one system controls the majority of the power. For instance, employers have limited influence over curriculum content, programme delivery and curriculum updates. This is a policy issue in our context, one that makes it crucial to re-examine TVET curriculum development nationally to allow industries and TVET colleges to play a joint role in developing curricula and programmes. Renold, Caves, Bolli and Buerger (2016) suggest that employer-dominated programmes may lack generic and transferable skills in the curriculum, that they may not include enough theoretical information alongside practical information, and that the programmes may be updated only when one specific job changes rather than to reflect changes at the occupational level. Therefore, in the case of TVET programmes, EEL is a useful concept with which to assess the relationship between education and employment. All TVET programmes at all levels of an education and training system, such as upper-secondary dual TVET programmes and various levels of post-secondary and tertiary professional education, are considered to be part of the trajectory that includes a TVET curriculum (Renold et al., 2016). Normally, each educational level has only one programme, whereas some countries offer many TVET programmes at a single level (Rageth & Renold, 2019).

Multiple curricula for diverse vocations are provided in TVET programmes, and the extent of the vocational curriculum varies widely across nations. For example, Finland's largest upper-secondary TVET programmes provide for eight disciplines, whereas Estonia has 657 (Renold et al., 2016). The EEL does not assess all the components of a TVET programme – only those that are related to the education–employment linkage. These components are determined by looking for every instance in which players from the education and employment spheres can interact or exchange power throughout the educational value chain (Rageth & Renold, 2019). Curriculum design, curriculum application programme delivery and curriculum updating are the three steps in the curriculum value chain that make up the index's three stages. For this reason, a nationally developed curriculum compiled with minimal input from other critical stakeholders in the sector is a limited product that needs to undergo reconsideration and revision by policy-makers if it is to fulfil the needs of both students and employers.

Education and training in developing countries

The EEL was developed and tested mostly in developed countries (Renold et al., 2016). Because the index is functional rather than institutional, it is context-agnostic in theory. However, in the developing world, one problem of special relevance is the rigidity of both the TVET curriculum and the labour market into which it feeds. In developing countries, non-formal and informal education and training are still widespread and constitute a significant way of obtaining information and skills (International Labour Organization, 2012). These avenues for skills and knowledge acquisition should be considered when authorities attempt to solve the problem of unemployment in these countries.

Formal, non-formal and informal learning

EEL is ensured if educational and employment systems are matched. However, these systems vary, and in the case of educational systems, they can be either formal, non-formal or informal. The technique of learning, rather than the degree or kind of information received, distinguishes formal, non-formal, and informal learning. However, definitions are often ambiguous and depend on the circumstances in which the learning takes place (Carron & Carr-Hill, 1991; Eshach, 2007). Formal training programmes, in general, are part of the formal education system, which is regulated by a curriculum and recognised by the country's education authority through certification (UNESCO, 2011). They must meet at least one established qualifying criterion and should consist mostly of classroom instruction; however, they might also consist solely of tests. They provide credentials that open up prospects for further study and training in the education and training system, making them appealing to students.

Non-formal training can consist of a class or a course that follows a curriculum but which is not part of the educational system or recognised by the educational authorities (UNESCO, 2011). Language programmes at a community centre and a variety of continuing education alternatives are two examples of non-formal training.

Informal learning occurs outside of the educational system and is usually unplanned and unintentional – it is simply experience-based knowledge. UNESCO (2011) suggests, for instance, that someone who learns a language through conversing with others who speak that language is doing so informally. Although informal and non-formal education and training are still characteristic of the systems of developing countries such as South Africa, in the present study, the researchers focused on formal programmes that are part of the education and training system identified through the case study of two TVET colleges.

Informal and formal economies

Labour markets can also be either formal or informal. The International Labour Organization (ILO) (2012), when explaining the informal economy, broadly indicates that it comprises those economic activities or markets that are – in law or practice – not covered at all or are inadequately covered by formal arrangements. An informal economy, moreover, is often characterised by a high prevalence of poverty, inequality and susceptibility to deficits of decent work. At the same time, the informal sector employs more than 60% of the workforce worldwide (ILO, 2018). According to Moodie, Wheelahan and Lavigne (2019:06), ‘TVET plays an important role in supporting people in the informal sector in transitioning to the formal sector through ad-hoc training’. As a result, graduates of formal training programmes in Chile and Costa Rica often go on to work in the formal labour market (Medina, Jonelis & Cangul, 2016). Moreover, in Benin and Nepal, graduates in most instances end up in the informal sector because it employs between 65% and 80% of the entire workforce (Medina, Jonelis & Cangul, 2016).

In the South African context, the provision of TVET is formally designed at a national level to cater mainly to employment in the formal sectors of the economy, with little emphasis on preparing graduates to enter the informal sector. Perhaps this formalisation of TVET training to serve only the formal economy will have to be re-examined because the extent to which education (mis)matches affect the labour market is largely influenced by the pattern of linkages at the local, regional and national levels. In certain countries, education is mostly vocational and graduates are assigned to a limited number of jobs; in others, students are given broader degrees and employees are encouraged to move through the job market (both informal and formal) rather than follow a certain rigid path from formal schooling to formal employment.

Attending to structural differences is expected to have an impact on employment outcomes, which are likely to be more positive in countries where educational systems match specific professional roles. The risk of unemployment appears to be minimal when there are strong links between educational outcomes and occupational positions – which, in the case of the South African TVET system, appears not to be the case. Based on the experience of many TVET graduates, quite the contrary appears to be the reality. Consequently, educational routes should be realigned with particular employment opportunities in the workplace, especially in the field of engineering, which is the field of study and expertise of the students

participating in the present study. Therefore, we argue that re-examining and revising the core design of curricula and developing TVET curricula in partnership with businesses may serve to resolve some of the problems and barriers to entry graduates face when they attempt to enter the formal economy, especially as newly qualified engineers.

Research methodology

A qualitative data-gathering method was applied in this research, which was undertaken by employing a self-administered qualitative questionnaire that required participating students to express their views in response to a number of questions. The qualitative method was chosen because it usually aims for depth rather than quantity of understanding. Creswell (2002) and Henning (2004) both describe qualitative research as a set of methods for conducting research and as a set of beliefs about the knowledge of the world. Questions were piloted to test their reliability and validity. Twelve people were sampled in this phase; the purpose of the research was explained to them and their consent was obtained.

Participants were asked to complete the questionnaire which was to be used in the final study and to provide comments about the language, relevance and consistency of the questions. Eight participants completed the pilot questionnaire, the aim of which was mainly to test whether the language made sense, the questions were relevant and whether synergy, coherence or consistency were present throughout the questionnaire. The respondents all agreed that the questions were expressed in simple, plain and clear language, could be answered easily and were suitable for an empirical study. In seeking to understand the TVET engineering students' perceptions of their qualification and employment prospects, two colleges in the Eastern Cape were identified as case studies for this research. Babbie and Mouton (2001) define a case study as an empirical research enquiry that explores an existing phenomenon in its real-life context, especially when boundaries between the phenomenon and the context are not clearly articulated.

Sampling and data-collection procedure

Purposive and convenience sampling was employed to select the participants. As indicated, two colleges were chosen because they were conveniently close to the researchers' location, and one researcher had worked with the colleges on previous projects. Appointment dates to meet with students on each of the engineering campuses were arranged with the management of both colleges. During the meetings, the researchers briefed the colleges' management about the study and its objectives and permission was granted to conduct the research in both colleges. Moreover, it was planned that during each interaction with the students, one or two senior people – mainly college lecturers in the engineering department – would support the study and encourage participation. The participants were briefed about the study objectives, the importance of their participation (to which they willingly agreed) and management's support of the project. In addition, especially before being given the questionnaires, the participants were informed about their rights in the study process, that their participation

was voluntary and that they could withdraw from participating in the study at any time, without any obligation to provide reasons for doing so. They were also asked whether they had any questions, after which they were handed the self-administered questionnaire to complete.

A qualitative self-administered questionnaire was used to collect data from the participants because of its suitability for a study among an adequately literate population. The participants were expected to answer questions appropriately and present their views on the topic presented to them. Qualitative questionnaires are open-ended in nature and are used to gather data about people's beliefs, feelings and experiences concerning programmes, services and activities, for example.

In the present study, the open-ended questions were designed in such a way that the participants had the freedom to express their views in response to them, without any influence by or clues from the researcher. The questionnaire comprised four sections:

- high school background;
- current studies;
- the curriculum and knowledge required by industry; and
- employment opportunities.

A total of 200 students enrolled for various engineering programmes at the third-year level across the two colleges were included in the sample. All of them were given the questionnaire to complete, with each college participating on a separate day. Of the 200 participants, only 113 answered all of the questions, which determined the final size of our sample. The gender profile of the participants was 64 females and 49 males; their ages ranged between 18 and 29 years. They were all in their final year of study in their respective engineering programmes.

Data analysis

In social research, after collecting data, the researcher is responsible for transcribing the written responses for the purposes of in-depth data analysis in order to select and interpret the data that are useful for drawing and supporting conclusions about the research phenomenon. In the present study, the analysis involved coding and categorising the data according to emerging themes. This process of coding and clustering or dividing up data according to similarities and/or differences was followed by the interpretation of the themes according to further patterns that emerged to explain the phenomenon being investigated in more detail.

Therefore, thematic analysis – the process of segmenting, categorising and relinking data before final interpretation – was used to cluster the data that emerged from the present study into various categories that became the themes and sub-themes of the study. The clustering of the themes was critical to interpreting, explaining and discussing the results of the data analysis in the light of the participants' words that are quoted directly in this article.

Results and discussion

In the first instance, the results of the data analysis revealed divergent perspectives on the importance of a TVET engineering qualification. While the majority of the participants (79) reported that the qualification is undervalued and does not guarantee employment, another 34 participants maintained that it is in demand in the labour market. These views formed two of the four main themes that emerged from the data analysis:

1. There is a high demand for a TVET engineering qualification (the perception of 34 students).
2. A TVET qualification does not guarantee employment (the perception of the majority of the students, that is, 79).
3. A qualification counts for more than experience.
4. Job scarcity is more of a problem than a lack of skills.

Each of these is now elaborated upon.

There is a high demand for a TVET engineering qualification

The results of the data analysis showed that 34 participants perceived a TVET engineering qualification to be in high demand in South Africa. Whereas these participants acknowledged the prevalence of youth unemployment, especially among graduates, they were confident that with their TVET engineering qualification they would be employed. Participant 04, a 21-year-old third-year female student following a renewable engineering course at one of the TVET colleges, had this to say:

There is a high demand for renewable courses in the mainstream economy and labour market, therefore getting a job will be easy. I am confident because our supply of electricity is under a lot of pressure; I think my skills will be in demand because there are not many electricians around, more especially in the Eastern Cape province.

The electricity crisis or load-shedding that is engulfing the nation is one finding that seemed to be a major reason for the students' perceiving their qualifications to be needed in the labour market. A participant expressed the following view:

My engineering is equipping me with the necessary tools and skills to avert load-shedding affecting our shrinking labour markets.

Some of the participants indicated that solutions to the electricity crisis are wind energy, hydropower, solar energy and geothermal power and that these solutions involve skills which the engineering programme they had pursued had equipped them to be able to find or create employment opportunities. The renewable energy programme available at one of the TVET

colleges in the Eastern Cape appears to have given hope to these young students. Furthermore, the recruitment and training unit at the college, which often shares employment opportunities with the students, made the participants more confident about their employment prospects.

TVET qualification does not guarantee employment

In contrast to the view expressed above, 79 participants perceived that TVET qualifications in general do not guarantee immediate or direct employment after graduation. For these participants, the high level of unemployment in South Africa is a consequence of an economy that is not growing and therefore unable to generate more jobs, especially for the number of skilled people available. Participant 08, aged 22 years, mentioned the following:

Renewable energy qualification has just been introduced in SA, so it will take a while for the job market to grow, and [it] will not be easy to get job ... Besides, finding a job in South Africa is difficult, I have seen it before, some people they just do piece jobs, and they do not get jobs ... they have graduated for, even with their engineering qualification.

This participant differed from others in the cohort, who asserted that the renewable energy course might lead to employment. They reported that because it is a new course and not known in the market, finding a job in this field was not easy in South Africa.

Furthermore, some students in the engineering stream reported that a qualification in itself is not enough. For instance, there is a process that a job-seeker must undergo in order to be trade-tested. Participant 27, a young female aged 23 years, supported the above perception, stating the following:

An engineering qualification does not immediately lead you to employment; depending on the stream, you have to undergo the trade test, which in itself does not lead to employment.

This finding refers to apprenticeship training in South Africa – also known as formal dual-type training because it combines workplace and institutional learning in a national qualification. In the South African context, a Quality Council monitors the apprenticeship training programmes for Trades and Occupations (QCTO), whereas the National Artisan Moderation Body (NAMB) oversees the quality assurance of apprenticeships on behalf of the QCTO. TVET colleges supported by Sector Education and Training Authorities (SETAs) could assist graduates who have to complete additional work-based training components by facilitating linkages or partnerships with relevant companies that operate in a particular trade or field.

The essential need for networking with and connections in industry seems to be another reason why students perceived that a TVET qualification alone would not help them secure employment. Moreover, there was a view that most of the job advertisements in newspapers hardly ever stipulate a TVET qualification as a criterion for consideration, which in itself casts doubt on its value. Added to these factors, participant 41, a male aged 26 years, observed that TVET engineering students lacked employment opportunities in post-democratic South Africa because the economy was not growing:

In a democratic South Africa, it seems getting a job whether qualified and educated is very difficult, especially if you come from a TVET College; and I know many students who did the engineering course and they are unemployed.

This is supported by the fact that an increasing number of graduates – even those with a university qualification – lack employment opportunities. As a result, the participants perceived their TVET qualification to be particularly lacking in value. This view was enunciated quite simply by participant 49, a female aged 24 years:

Our course does not have that much value.

As has been explained in this article, although the students who participated in the present study held contrasting views on the TVET engineering qualification in relation to the world of work, the majority of them indicated that employment opportunities are hard to find in South Africa, particularly for those with a TVET qualification.

Make voluntarily service compulsory, funding available for SMMEs and encourage further study

Sub-themes of the abovementioned second main theme were these: make voluntary service compulsory; provide funding for small, medium and micro enterprises (SMMEs); and encourage students to study beyond an undergraduate qualification. In other words, those who reported that they were unlikely to find a job because a TVET qualification does not appear to have value or worth in the South African market and does not guarantee direct job opportunities proposed three solutions. First, the participants suggested that voluntary service should be compulsory for all graduates to enable them to gain practical training and exposure. This voluntary service, they suggested further, should be without payment or a stipend. Secondly, the participants suggested that SMMEs and cooperatives should be established as they could make a contribution to the economy. Such enterprises should be funded or supported in some way by the state to enable them to thrive. Finally, they recommended that students should study beyond their undergraduate qualifications to equip themselves with research expertise and skills and that the state should fund these post-graduate studies.

Qualification counts more than experience

Some participants reported that the requirement that graduates should have work experience is an unfair practice because a qualification is more crucial than experience. Moreover, they asserted, requiring experience of graduates is an unfair barrier to employment and should be done away with. In this regard, participant 21, aged 22 years, revealed this:

Experience as a prerequisite for employment is unfair and a barrier to young people who have spent years getting qualifications.

Some of the participants remarked that a qualification equates to experience and therefore it should be sufficient to gain entry to the labour market. According to these students, the years of training and learning skills required to acquire a qualification should be considered sufficient experience for an entry-level job. Moreover, the participants maintained that a lack of soft skills – such as hard work, confidence, teamwork, honesty, determination and commitment – which are often reported as crucial to young graduates, should also not be a barrier to employment, as they are not taught in educational institutions. Participant 35, aged 27 years, mentioned that while soft skills are important elements,

[t]hey should be secondary for employment purposes, with primary factors being qualifications.

As has been shown above, the term ‘qualification’ included in the above quotation was used interchangeably with the term ‘skill’ by students, such as participant 35, who perceived the qualification as providing sufficient experience and skills for employment. Although soft skills are crucial in the workplace and are a focus in the TVET system, students suggest that they should not be a barrier to employment, especially if a candidate has the necessary formal training.

Job scarcity is more of a problem than a lack of skills

The participants perceived that the shortage of work opportunities in the market is the main cause of unemployment, which was declared a national crisis by President Cyril Ramaphosa in his state of the nation address in February 2020 (South Africa, 2020:30). The participants observed that despite graduates having skills and qualifications, they remained unemployed because there are insufficient job vacancies. This observation that a lack of jobs is the problem, as opposed to a lack of skills, is consistent with the view expressed in the literature, which found that university graduates are less likely to be unemployed compared to TVET graduates (Nkosi, 2017). Participant 83, a female aged 28 years, mentioned the following:

The only problem we are faced with is job scarcity contrary to skills scarcity and therefore unemployment affects not only the uneducated youth but also people

with education qualifications most from college and to a lesser extent higher education institutions.

This participant's remark is consistent with the assertion that the number of unemployed TVET graduates is increasing (Nkosi, 2017).

Discussion

The finding that the lack of work opportunities is due to the economy not growing is consistent with the emerging body of research which points to the fact that the economy is confronted with growth constraints, and consequently a lack of job creation (Motala & Vally, 2013; Allais & Nathan, 2014; Ngcwangu, 2014; Treat, 2014; Reddy, Bhorat, Powell, Visser & Arends, 2016:108). Moreover, contrary to much of the literature attributing unemployment to a skills shortage, the findings seem to contribute to a growing body of literature that points to the lack of growth in the economy as a major reason for the high level of unemployment in South Africa. In 2018, unemployment stood at 32,5% (Statistics South Africa, 2018:130).

The TVET engineering students' perception that the South African economy is not growing, and is therefore leading to high unemployment levels, is consistent with Allais and Nathan's (2014) assertion that South Africa's economy has experienced growth in joblessness since 1994, with employment having been more capital intensive than labour intensive in the years since then. Whereas a few participants perceived an engineering qualification as being in demand in South Africa, the majority of the participants reported that a TVET qualification does not lead to immediate or direct employment. Prinsloo (2011) concurs with the participants' assertion that the qualification does not guarantee employment, as students may lack the experience required by employers. There was consensus among the participants that South Africa is faced with a lack of jobs rather than a shortage of skills. In addition, the findings revealed that work experience demanded by employers impedes TVET graduates' employment prospects. Participants described this experience requirement as a barrier and an unfair practice that hinders TVET graduates' employment prospects, saying they cannot gain experience outside of on-the-job training provided by the very same industry that should absorb them in the future.

Conclusion and recommendations

Despite graduates from the TVET education sector finding it difficult to secure employment, TVET remains important to the economy of South Africa, not only for enabling young people to find employment but also for making it possible for them to create employment for themselves and others. Government should continue to place emphasis on TVET qualifications but should consider restructuring them in line with infrastructure development. Moreover, the TVET sector should collaborate with industry to create more opportunities by training young people interested in becoming plumbers, electricians, machine operators, carpenters, boilermakers, bricklayers and other artisans.

Linkages between colleges and industries are considered necessary to reduce unemployment. This may require rethinking the centralisation of TVET curriculum development and provision and affording companies the opportunity to contribute to curriculum development for TVET programmes. As elaborated on in the conceptual framework section, EEL that focuses on workplace needs is likely to improve the currently limited influence that industries or employers have on TVET curriculum content and updates, as well as on programme delivery. The alignment between education and industry will be more likely to lead to the work readiness required of TVET graduates and to closing the skills gap. Indications from the research are that the current TVET curriculum design model should be rethought or reformed, as nationally developed curricula within which TVET colleges play a limited role and which allow minimal input by the industries they are mandated to serve, are keeping college training programmes and work experience further apart rather than bringing them closer together.

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