

## **A Surprising Problem that Emerges for Humanities Academics Teaching STEM to Communication Students**

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### **ABSTRACT**

*In this article, researchers examine two humanities teachers' experiences designing a new interdisciplinary STEM-humanities subject for first-year communication students in Australia. The teachers chose to integrate new disciplinary knowledge themselves. In this article, the researchers use two methodologies to examine the teachers' experience: (1) a "small data" case study and (2) self-study and post-qualitative dialogic enquiry. Qualitative interview data were collected from the teachers (n = 2) and students (n = 6), and a thematic analysis was conducted. The primary author-researcher—also one of the teachers—reflected on the findings in a first-person narrative account. Emerging from this study are several advantages and challenges of a "dialogic" model of interdisciplinarity in the context of the creative arts. Notably, the surprising problem referred to in the title of this article is that university teachers' affect can lead to an oversight of one's own expertise when designing and implementing interdisciplinary approaches themselves.*

**Keywords:** Assessment, Data Visualisation, Interdisciplinary, Pedagogy, Storytelling

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## INTRODUCTION

This article examines a case study where the primary author-researcher and one other humanities lecturer designed and taught as subject coordinators (SCs) a new first-year interdisciplinary compulsory subject that teaches humanities students data gathering, analysis and visualisation skills for producing narrative non-fiction stories. The subject in the Bachelor of Communication is called Data Analysis and Storytelling (DAS). The SCs used funds provided by the government's National Priorities Industry Linkage Fund (NPILF) to develop the subject.

In recent times, interdisciplinary approaches in higher education (HE) have been posited as essential strategies for solving complex societal problems, such as unemployment, healthcare and climate change (Hetherington & Torres Olave, 2025; Scott, 2026; Smyth, 2017; Wang, 2024). In Australian universities in recent times, the interdisciplinary combination of the humanities with science, technology, engineering and maths (STEM) has been a response to the government's desire for humanities graduates to possess STEM skills (Australian Government, 2024).

Existing research explains some benefits of interdisciplinarity (Bear & Skorton, 2019); and in the context of the humanities, research also explains challenges of interdisciplinarity (Cohen et. al., 2026) and different models of interdisciplinarity (Carrell et. al., 2020; Gleason, 2020; Hetherington & Torres Olave, 2025). In terms of challenges, research explores teachers' feelings about designing and implementing interdisciplinary approaches (Cohen et. al., 2026). Studies that address teachers' feelings, or affect, interrogate teachers' professional identity (Beijaard et. al., 2003).

The context of DAS is unique, and this is because STEM content has been part of creative industries subjects for many years already—although often ad hoc. Prior to the government's NPILF funding of interdisciplinary projects, creative industries disciplines (journalism, advertising, marketing and screen media) have included elements of STEM; for example, subjects with data analytics in strategic marketing/advertising, and data journalism. STEM, then, is already integrated into parts of the humanities, and this is a predisposition shared by humanities educators with professional experience in the media industries. When, however, academics adopt in a wholesale way interdisciplinary approaches in the creative industries context, what factors influence these decisions and what models are best suited—

in terms of their strengths and weaknesses? Given these questions this article explores the following two research questions:

RQ 1: What does an analysis in practice reveal about what HE teachers consider when approaching models of interdisciplinarity?

RQ2: What advantages and challenges of interdisciplinarity emerge when approaches are examined in practice?

## LITERATURE REVIEW

More than three decades ago, Stember (1991) noted the pervasive organisation of Western HE into disciplinary silos. Quoting from Gaff (1989), they identify the dominance of disciplinary barriers in, for example, the organisation of colleges by departments, the hiring of staff, and staff identity. This dominance continues in HE today, as noted by Hetherington and Torres Olave (2025) and Bedewy and Lavicza (2023).

Interdisciplinary teaching traverses the boundaries of typical disciplines (Ashby & Exter, 2019; Goedereis & MacCartney, 2019). Many researchers agree that interdisciplinary approaches provide benefits that develop into lifelong learning skills essential to a student's future learning and may contribute to increased abilities to solve real-world problems (Jones, 2010; Koch et al., 2017; Youngblood, 2007). Interdisciplinary studies can also benefit educational institutions by building connections between disciplines and across departments, as well as acting as a source of pedagogic knowledge that can be shared among colleagues (Kleinberg, 2008). The belief that interdisciplinary approaches can benefit graduate employability is noted by Bear and Skorton (2019, p. 16): "A holistic education that integrates the arts, humanities, sciences, and engineering will make students more attractive candidates for employers."

A teacher's approach to interdisciplinarity depends on many factors, including concerns around lack of expertise, lack of resources, and bureaucratic issues, such as how to meet standardised objectives not tailored to interdisciplinary work (Weinberg & Sample McMeeking, 2017). Although universities sometimes view interdisciplinary initiatives as low cost, research has noted that appropriate institutional support is required for success (Stember, 1991). Research also documents organisational constraints, including the complexity of receiving teaching workload for teaching across disciplines (Bordeau & Wood, 2021; Carrell et. al., 2020). For example, Wang (2024) describes their approach to interdisciplinarity in response to school resources and practical considerations.

Research notes challenges of interdisciplinarity including knowledge acquisition (Weinberg & Sample McMeeking, 2017). In the context of the humanities, interdisciplinary approaches have been perceived as intimidating (Wang, 2024), where design of "new curricula requires effort on behalf of the

teachers, who sometimes feel they lack adequate training” (Cohen et. al., 2026, p. 376). Similar is the challenge of not knowing how to “be interdisciplinary” and how to overcome barriers created by the cultures that distinguish disciplines (Bossio et al., 2014). Though some educators may be uncomfortable with the idea of teaching outside one’s area of expertise, this can also have advantages. As Kleinberg (2008, p. 11) argues, it can lead to “creativity” and foster “new and exciting research.”

Some studies note the impact of challenges on teachers’ self-confidence, which is connected to their identity. The concept of professional identity is an umbrella term that encompasses the influence of factors inside and outside the classroom on teachers’ lives (Goodsen & Cole, 1994). Identity is multifaceted, dynamic and evolving, and its formation includes multiple knowledge sources, including affect, human relations and subject matter (Beijaard et. al., 2003, p. 114). The connections between teacher professional identity and interdisciplinary teaching, therefore, are worthy of attention.

Interdisciplinarity has been referred to by many names, including “STEAM,” “convergence,” “transdisciplinary,” and “SciArt” (Bear & Skorton, 2019, p. 61). Different terminology reflects the different approaches to combining disciplines. Ashby and Exter (2019, p. 203) note three main approaches. First, cross-disciplinarity is when ideas and/or “tools” are borrowed from neighbouring fields to “explain phenomena”; for example, using chemistry to explain photosynthesis. This approach typically results in one discipline being the “passive contributor.” Next, multi-disciplinarity is when different disciplines are articulated side-by-side and the result can be an “encyclopedic view” without “purposeful synthesis.” In this approach, multiple subject-matter experts are united by a common theme. Third, transdisciplinarity involves a synthesis of disciplines where knowledge is not attributable to a specific field, often resulting in the creation of new/shared frameworks.

Considerable research outlines interdisciplinary precedents in the context of STEM and humanities. It is commonplace for the humanities to be employed to serve STEM. Carrell et al. (2020) explain the history of what they call “STEM with...” approaches; for example, STEAM involves STEM with the arts, and STEMM involves STEM with music. These researchers are positing the arts/humanities as an “elaboration technique” for STEM. Gleason (2020) describes a fundamental model of interdisciplinarity where the humanities “serves” STEM. Gleason (2020) describes the reasoning behind this approach as a “second order instrumentality”: “With business growth the reigning paradigm for assessing academic value, humanities teachers can tap into STEM’s economic power by re-designing their classes toward STEM ends” (p. 189). One can identify a conceptual similarity to Ashby and Exter’s critique of the “passive contributor” in cross-disciplinarity mentioned above. Gleason explains a conscious trade off, where humanities content is “cut” to enable the STEM focus; for example, “The literature

class may have to cut some work on figurative language to make room for the sections from *The Origin of the Species*.”

Gleason (2020) outlines three other models of interdisciplinary pedagogy typical of the STEM-humanities context. The “critical vantage approach” is where humanities “correct” STEM by adding theoretical approaches, such as creativity and empathy; for example, including visual representations to encourage students to grapple with questions of representation (presumably missing in the STEM curriculum). This approach acknowledges the power of the humanities while also positioning the humanities as “reactive, or even subservient” (p. 194). A third model describes a more equitable relationship. Typically, this involves a co-teaching model, coined by Grossman (cited in Gleason, 2020, p. 195) as a “‘kaleidoscope’ technique” and “‘jigsaw’ or modular approach.” While this approach is powerful, problems include the depth of intellectual gaps in instructors’ knowledge, challenges effectively integrating the disciplines (p. 198), and logistical problems including complexities to do with planning time and scheduling. A fourth model is when STEM-humanities are integrated as “helpful allies” (Gleason, 2020, p. 198). An example—the “open door” model—might involve using scientific tools to create art. Here, the humanities are not taking a corrective approach, but “leveraging” STEM technologies and tools to “unlock” humanities approaches and texts (p. 199). Related is the discipline of the “Digital Humanities” where “computational techniques” are applied to “traditional humanities problems” (Digital Humanities, n.d.), enabling the investigation of entirely new problems. Gleason (2020) glosses some concern with this model (noting the context of the Digital Humanities), in terms of the tendency of research to focus on the tools and the technology, encouraging a “fetishisation of ‘numerical answers’” (p. 200).

We can add a fifth “model” of STEM/STEAM interdisciplinarity that involves a transformation of disciplines—in other words, a reconfiguration of the binary relation underpinning the four models described above. Drawing on a “post-qualitative, dialogic inquiry approach,” and working with new materialist theories, Hetherington and Torres Olave (2025) describe a “co-construction” model of interdisciplinary collaboration in the context of climate challenges in teacher education. In my reading, this “theoretical stance” (p. 175) aligns with radical empiricist concepts of differential articulation and positive difference (see: Dawkins, 2026), in so far as, from a dialogic “encounter” of knowledges, new ideas “emerge” that transcend binary differences. The authors describe the “cutting together-apart of the temporarily bounded material-dialogic space [...]” (p. 161), “orientated towards critical imagination” (p. 175). The benefit of this model includes the emergence of questions and insights from the specific context being studied as well as dialogue across contexts. This, Hetherington and Torres Olave (2025) claim, leads to engaged authorial reflection, encouraging further dialogue and reflection in future research.

## DATA ANALYSIS AND STORYTELLING (DAS)

DAS is a level one mandatory subject. The subject guide explains that students “will gain practical experience finding data sets, cleaning and analysing data, developing insights and communicating findings in visual, oral and written formats for various audiences,” and this will involve using “industry standard analysis and visualisation tools to effectively answer research problems and communicate the impact of data, ethically and mindfully.”

DAS was conceived as part of the researchers’ university’s response to the NPILF. This fund provided block grants to universities to “support enhanced engagement with universities and industry to produce job-ready graduates” (Australian Government, 2024). The SCs volunteered to design and teach DAS with funding provided by the NPILF. The subject was first launched in the Australian spring of 2023 and, at the time of writing this case study, DAS has completed its second iteration.

The SCs note a constructivist approach to the design of DAS, where students pose questions about a problem and synthesise sources of information to propose a solution. In the subject, students use data, in spreadsheets and simple charts (visualisations) created themselves, to develop insights and meaningful arguments about a research problem, which they present as a journalistic style narrative non-fiction story [1]. DAS includes STEM curriculum (data wrangling, cleaning, analysis and visualisation) and communication/creative industries curriculum (narrative journalism: “storytelling”). The subject involves a hands-on focus, cleaning and visualising data, and a theoretical focus, involving legal and ethical considerations and students’ implementation of narrative storytelling techniques.

In terms of the NPILF, the SCs had to justify how funds would be spent. They approached the development of DAS by learning the required STEM skills themselves. This approach is not without precedent in the humanities (Wang, 2024). Funding was used to support the SCs to design and develop curriculum for DAS, including the SCs’ professional development, which involved software and technology training. Curriculum research involved consultation with STEM colleagues in other schools at the university.

The funds were also used to develop a research project from DAS, and this included employing a research assistant (second author-researcher: KN). The intention of the project was to document the SCs’ approach to interdisciplinarity in the first iteration of DAS and explore the challenges encountered and positive experiences. The aim is to contribute practical advice to colleagues planning to adopt interdisciplinarity in subjects.

## RESEARCH METHOD

This article reflects on the DAS project: it is a reflection on a single case study. A case study is an in-depth, contextual analysis of a specific instance or phenomenon, here an interdisciplinary approach at one university where humanities teachers, in the context of creative industries disciplines, combine humanities and STEM. Qualitative data was gathered for the case study, including interviews with the SCs ( $n = 2$ ) and student interview data ( $n = 6$ ). A thematic analysis was conducted, following Braun & Clark's method (2006). It is a “small data” case study (boyd and Crawford, 2012) [2], not unlike Volkmann and Anderson's (1998) focus on one teacher, and Samuel and Stephens's (2000) case study of two teachers.

The reflection draws on two methodological inspirations. First, self-study is a practice-focused methodology growing in credence in the academy. It is “utilised as a vehicle for professional understandings and development”; it is an appropriate methodology aligned with a researcher's “commitment to improvement,” it involves an “investigation of practice” and is orientated towards the practical communication of findings to empower others in related fields; in short, “Those educational practitioners engaging in self-study are focused on changing their professional praxis with a view to implementing renewed best practice” (Mulligan, et. al., 2025, p. 6). Hua and Yung (2025) note that—citing Hamilton and Pinnegar (1998, p. 240)—“There are no predetermined methods or theories for self-study, its researchers use ‘whatever methods will provide the needed evidence and context for understanding their practice’” (p. 40).

Second, post-qualitative dialogic enquiry values experimentation and the “creative nature of research [...] where theory and ‘data’ (which is often loosely defined) are ‘read together’ to achieve new insights” (Mazzei, 2014, cited in Hetherington & Torres Olave, 2025, p. 161). The primary researcher (RD), aligned with self-study objectives, provides a reflection on the thematic analysis in the form of a narrative non-fiction account. Post-qualitative reflection enables a production of ideas about strengths and weaknesses of interdisciplinary approaches emerging from multiple levels of this project's relations; it is an approach considered effective for encouraging dialogue and ongoing reflection (Hetherington & Torres Olave, 2025).

### Qualitative Data

The current study uses a qualitative approach to examine the teachers' interdisciplinary approaches in DAS and students' responses to the interdisciplinary design of the subject. A default way of reviewing a new subject is to consider student grade data—but this approach is limited here. Students may score well, or not, for many reasons not accounted for in grade data. Qualitative data was chosen because it is “a source of well-rounded and rich descriptions of

processes in identifiable local contexts” (Miles & Huberman, 1994, p. 1). Human ethics approval was granted for this research (project H15608).

## **Participants**

Semi-structured interviews were conducted with teachers and students. Participant gender and age is not part of this project's conceptual framework and was excluded from the data collection. The teachers were the co-coordinators (SCs) of the subject, who collaborated on the curriculum design and pedagogy, and shared the teaching load evenly. One of the SCs is the primary researcher in this study; the second teacher agreed to participate in the research because they shared the aims but declined to collaborate due to competing commitments. Student participants were selected through convenience sampling. A notice on DAS' learning management system (LMS) was posted during the semester inviting students to participate.

## **Interview Protocol**

Interview questions were designed by the primary researcher (RD) and research assistant (KN) to align with the RQs (Creswell & Creswell, 2019). Staff and student interview questions consisted of three parts: warm up questions, exploration questions and exit questions.

## **Interview Procedure**

All interviews were conducted by KN, with no recorded conflict of interest. KN was remunerated using project funds from the NPILF. Students were informed of KN's involvement during recruitment, and that their participation would take place after results release to avoid any concern of bias resulting from students' participation. Students were also informed their identities would remain anonymous, and they would be remunerated for their time with a AUD\$50 gift card—also from the NPILF. Regarding the staff interviews and given RD is both a researcher and participant, the semi-structured format was chosen because it provided the flexibility for KN to probe the primary researcher, encourage elaboration, and challenge. All interviews were conducted online and recorded with permission. Participants provided written informed consent prior to the interviews. Each interview was conducted until data saturation, consistent with the interview questions, was achieved (Saunders et. al., 2018). Student interviews were transcribed by KN and identifying data redacted. Teacher interviews were also transcribed by KN.

Questions asked teachers to reflect on their disciplinary expertise; their perception of the strengths and weaknesses of their teaching generally; their

preparation designing and delivering DAS—and their approach to this new subject; their comfort designing and delivering DAS; the challenges, high points and lessons learned designed and teaching DAS; and their opinions on student engagement in the new subject.

Student questions were designed to (1) elicit responses that would help the researcher's see the students' perspective on the interdisciplinary model adopted in DAS (strengths and weaknesses), and (2) triangulate the data in the teacher interviews, specifically the teachers' reflections on their approach to DAS in response to their professional identity. Students were asked about their feelings engaging with the subject matter and teaching in the subject, their confidence as they progressed through DAS, and their perception of the relevance of the subject.

## **Data Analysis**

A thematic analysis of interview data was conducted by RD. A hand-coded approach was adopted because the researchers believed a manual analysis would allow for a closer inspection of the data. Braun and Clarke's (2006) method was implemented; it offers a "clear and usable framework for doing thematic analysis" (Maguire & Delahunt, 2017, p. 3353). First a descriptive procedure identified an inventory of codes. Essentially, this was a "grounded approach" where data was not pre-coded, enabling the researchers to be more sensitive to the context (Charmaz, 2024). Second, patterns were identified to group codes into smaller sets, or themes. Any potential bias was mitigated by check-ins where the researchers reviewed each stage of the coding process.

## **RESULTS**

### **Teacher Interviews**

The purpose of the teacher interviews was to examine their approaches to interdisciplinarity in DAS. The coding process produced five themes.

#### **1. Teachers' Pre-Conceived Ideas about Disciplines**

This theme addresses factors informing teacher's approach to interdisciplinarity (RQ1). Both teachers explained their feelings while developing the subject matter of DAS, that STEM (in terms of the use of spreadsheets and basic maths functions) is "dull" and challenging to make interesting. Teacher two (T2) explained how teaching STEM aligns with teaching humanities insofar as students are being taught how to use "tools" [spreadsheets] and have a critical opinion about them. They explained that this approach was not unlike teaching students how to use technological tools in podcasting curriculum, for example.

Notable is the teachers' attitudes towards the new discipline as something that can be changed or transformed—not simply included; and this is not an unreasonable task since it has precedents in the humanities. This conception, of the transformation of a discipline, aligns with the fifth model of interdisciplinarity.

## **2. Teachers' Pedagogical Approaches**

This theme explains the teachers' pedagogical approach to DAS and addresses RQ1. Both teachers discuss their pedagogy as an attempt to make content they perceive as “dull” and maths-based, “interesting.” Involved was giving students practical, in-class activities and group challenges. Teachers set out to implement “conversation, group work and interaction” as well as “narrativise” curriculum and gamify classes through initiatives such as speed dating and quizzes. T2 notes a positive effect of the group work: “Seeing them working together, solving a problem, was the right call.” Both teachers agree that scaffolding the major assignments into a series of smaller tasks, often practised in class, helped students manage new STEM material. Teacher one (T1) notes their approach to making the data seem relevant by “giving them [students] things [case studies] they're interested in, like [...] sneaker brands and songs.” Evident in this theme is an account of how the teachers adopt model five of interdisciplinarity, transforming STEM by approaching it the same way they approach humanities concepts/ideas: critically, as in-class, group-based challenges— taking what T1 describes as a “talkie-talkie” humanities approach.

## **3. Teachers' Affect**

This theme explains how the teachers' feelings informed their approach to interdisciplinarity in DAS, as well as their feelings of success and achievement in delivering DAS. Theme three addresses RQ1 and RQ2.

T1 made several comments about a lack of confidence connected to not knowing the subject matter in what they considered “sufficient detail.” Similar comments were made about feeling confident when “drawing on things that are second nature”—and therefore feeling a lack of confidence teaching this subject. T1 also describes an uptake in confidence as “things become clearer as we go along,” and when students appear to be understanding: “getting it.” T2 describes their feelings about lacking fundamental STEM knowledge in terms of “comfort”: “I'm much more comfortable teaching theoretical stuff [because] I have a safety blanket which makes the process easier.”

Both teachers describe their enjoyment from mastering new disciplinary content themselves. For example, “I got a kick that I could actually do things” (T1). Both teachers also explain their satisfaction from seeing students effectively solve “STEM problems.” In addition, T2 describes a level of student engagement they

have not previously seen in humanities subjects: “Seeing them [students] in a technical domain and genuinely collaborating more so than I see students collaborating over a theoretical discussion was a high point [...], one of the most exciting moments I’ve had in the classroom in many years.”

This theme aligns with current research about teacher confidence being a key challenge of interdisciplinarity (Bossio et al., 2014; Cohen et. al., 2026). Moreover, a lack of confidence is rooted in teachers’ perceived professional identity, described in this theme in terms of relative levels of comfort. A positive impact on confidence is observed when teachers perceive interdisciplinary approaches as successful. Here we also see the value of interdisciplinarity for teachers’ professional development.

#### **4. Planning Curriculum**

This theme aligns with RQ1 and RQ2. It centres on the teachers' ideas about the challenges they felt designing curriculum when they weren't sure of the steps required to achieve their intended outcomes. For example, this challenge was described by T2 as "working out the route at the same time [as teaching]." They explain further:

We would start teaching the subject and then realise the path was changing [and] as we were teaching it, we were realising where the gaps in the student knowledge where that we hadn't anticipated, and at the same time we were learning the steps two to three weeks in advance of the students.

In another comment T2 explained the same problem, this time in the preliminary stages of DAS’ design: “We were able to organise industry interviews [record, edit and publish with technical support] but we weren’t really sure what to ask them.” Notable here is how teachers aimed to transform STEM curriculum in a humanities context by learning the STEM content themselves (Wang, 2024), but an unanticipated problem was not being able to anticipate curriculum challenges before they presented themselves. This would be a challenge specific to the first iteration of an interdisciplinary subject that adopts any model where teachers attempt to incorporate new disciplinary knowledge themselves.

#### **5. Teacher Support**

Theme five explains the teachers’ own perception of what they think is needed to better support their interdisciplinary approach. Both teachers acknowledge essential technical support for building online curriculum in the LMS, such as interactive visuals and video interviews. T1 also suggest that a specific kind of support would be valuable for future subject development,

explaining how a “third person” is needed to guide and report on how things are going: “[This is a person] who could liaise for us [...] a go-to person to sort of give you some guidance and maybe support the process [but] with a little more expertise.” Notable here is that T1 is not suggesting a discipline expert from another school, but a mediating person who could guide and support the teachers’ own approach to the blending of disciplines in DAS. In relation to RQ2, a challenge of interdisciplinarity is evident, and this is one associated with the transformative model of interdisciplinarity chosen. This challenge is *not* not knowing the new disciplinary content but needing a particular kind of support more akin to scaffolding and project management. A question arises then, who could provide such support in a school?

## **Student Interviews**

Student interviews provide an additional perspective on what the SCs reported in the teacher interviews. Coding produced three themes.

### **1. Authentic Activities and Student Affect**

This theme is aligned with the teachers’ approach to interdisciplinary in DAS in terms of the model chosen and their pedagogical strategy. Students described a sense of pleasure and satisfaction in DAS when manipulating data; for example, seeing how the data “had gone up and down, and the reasons for this, and [...] the changes, it was kind of cool” (S1). Other comments describe a student’s feelings of pleasure and pride in their work, in terms of the satisfaction of seeing the results of what they’re doing: “You could see how it was done [and] apply what we’re learning” (S4). These comments demonstrate the benefits of integrating STEM content, in this case data analysis and visualisation, with concrete discipline-specific problems, making the outcome of in-class activities authentically meaningful for the students.

### **2. Students’ Confidence**

This theme provides a perspective on teachers’ pedagogical approaches and the strengths/weaknesses of interdisciplinarity. The classroom was described as “a safe space,” and one student remarked, “I didn’t feel [...] stupid asking questions” (S4). Students also acknowledge that the subject’s assessment design, with larger assessments broken into smaller tasks, was a useful step-by-step approach, noting how the assessment tasks “all fall into place” (S2). Common among all students interviewed was a lack of confidence in the humanities aspects of the curriculum, specifically those concerned with writing and creative expression; for example, understanding what a “story meant” (S5) and “coming up

with [story] ideas” (S6). Notable in theme two, from the student comments on the “safety” of the classroom and their feelings of being supported, is perhaps the benefits of extra effort resulting from teachers’ own feelings of inexperience and concern about STEM in the subject. Suggested also is some imbalance in the subject’s focus, and this is in so far as students identify a gap in their humanities knowledge about storytelling.

### **3. Students’ Perception of Relevance**

Many students explained they could see the relevance of the subject for future careers. For example, “Because you’re always going to need to look at results [data] and see what we can determine from this, and why the results were skewed” (S1). This student also makes clear how their comments on the subject’s relevance were in the context of the “practical” nature of the subject. Theme three illuminates the teachers’ stated efforts to integrate data analysis as a problem-solving tool for students. Clarified is the teachers’ successful attempt in DAS to ensure STEM concepts are relevant for the creative industries.

## **DISCUSSION**

Following is a first-person autobiographical narrative, where RD reflects on the findings, in the context of their role as teacher-researcher in DAS, raising questions and offering insights. Following self-study research literature, these are “improvement-aimed” (Hua & Yung, 2025), with the intention of empowering “other stakeholders in broader educational fields to examine their praxis in a committed and practical manner” (Mulligan et al., p. 5). Similarly, material-dialogical enquiry prompts reflection and encourages ongoing reflection—rather than static representations of knowledge (Hetherington & Torres Olave, 2025).

### **RD’s Narrative**

I recognise my presupposition in the interview data that communication students would find STEM daunting because of its relative unusualness in humanities disciplines. While some research does support arts students’ reticence towards STEM, and it is certainly a cliché that subjectively informs my own perception of STEM, this presupposition was a preoccupation in my approach to DAS. Looking back over the thematic analyses, and the interview transcripts, anxiety and concern from students about learning STEM is not exactly common. One student explained feeling “scared” and “overwhelmed” in the first week of this subject, but it could be the case that this student feels the same way about any new subject. Points about my anxiety teaching STEM (and my colleague’s) are raised numerous times in the teacher interviews. Considering my own personal

bias just identified, it seems that anxiety about subjects that are outside one's area of familiarity is something teachers feel most significantly, and although research does discuss this (Weinberg & Sample McMeeking, 2017), there is less insight into the lack of an equivalent for humanities students' interdisciplinary learning of STEM. What I also cannot find in existing research is discussion of the problem with the pedagogical approach—a surprising one—that occurred because of my own anxiety (from my presuppositions about STEM education) about interdisciplinary expertise in this context. I discuss this shortly.

Given we (the SCs) felt some familiarity with the interdisciplinarity specific to the context of the creative industries, we decided to approach the development of DAS by learning the required STEM skills ourselves. Importantly too, we felt this would be a means for our own professional development, as noted in the interview data.

This approach, of course, has precedents (Wang, 2024), and engages with the models of interdisciplinarity noted in the literature review. On reflection, there are some notable characteristics of our interdisciplinary approach. We approached STEM from a perspective drawing on industry precedents that see STEM and humanities as intertwined; for example, creative industries professionals analyse data to optimise creative content, including advertising and journalism. This means that in DAS, the STEM content was not side-by-side with humanities approaches, and neither was it a “posture” to help the humanities; instead, STEM skills are another dimension of humanities techniques and approaches in the creative industries. Our position was that digital tools do not help the humanities but are a humanities concern. This approach in DAS breathes life into the fifth model of interdisciplinarity noted above, when one discipline is taken as a dimension of another; in other words, when disciplines are produced as productive entanglements of one another (Hetherington & Torres Olave, 2025). We taught DAS by creating an assemblage of disciplines, because this reflects the creative industries context in which STEM and humanities have evolved.

Did it work? First, while we knew how we wanted to teach STEM in this humanities subject, we lacked confidence. As the interview data notes, we felt that, at the end of the day, we just did not have a fundamental knowledge of STEM. Often this manifest in our inability to anticipate problems in our students' journey towards our learning outcomes. Also, we noticed how, in the context of this new discipline, we did not have the safety blanket provided by our long-held humanities expertise. This acutely impacted our confidence. Furthermore, despite an effort to evolve STEM into the humanities as a productive partnership, there was that bias we both held—in other words, our presuppositions that STEM is dull. This, and our discomfort-inducing lack of confidence, instead of challenging us and motivating us to move beyond our comfort zones (see: Carniel, 2018, p. 148), caused what I see now as an imbalance in our approach. It is from this imbalance that a surprising problem became apparent.

To begin to grasp this problem, consider some comments in the student interview data that were unexpected. Several students explained their difficulty in the subject-matter of DAS was with the curriculum that required their critical and creative thinking; for example, when asked to develop interesting and engaging narrative non-fiction stories from the datasets. One student expressed difficulty understanding what a “story” “meant,” also describing challenges “coming up with ideas and writing.” Another concurred, claiming they lacked confidence in the “writing parts of the assignments,” and difficulty with the “ideas part.” I recall also that engagement in class was noticeably low in many of these tasks, including evaluating journalism case studies.

This tells me that it is possible that our concern in the design of DAS about students’ level of expertise in STEM, and related, my presuppositions about student anxiety regarding STEM content, directly compromised the subject’s integration of content from our own “second nature” discipline. For me, consumed with the challenge of teaching outside my own area, I neglected to refresh my approaches to teaching the creative industries foci of DAS; or I overlooked critically reflecting on what I know, and do, to ensure its delivery was effective in the new context. Perhaps, therefore, confidence in terms of what one thinks they know, can result in complacency and pedagogical oversights.

I would not, however, design and deliver this subject differently, except to make a more conscious effort—and include related tutorial activities—to develop the humanities part of the subject in more detail, and I would dedicate more class time to these activities. This is to address the surprising problem of “disciplinary balance” noted above. It is clear now that despite our aims to evolve STEM and the humanities together, as a disciplinary partnership, our fundamental lack of confidence resulted in what could be termed, an imbalanced assemblage of STEM and humanities content. Emerging from this discussion, therefore, are challenges with the fifth model of interdisciplinarity. I maintain that learning the STEM skills myself, the data cleaning and visualisation skills, provided me with an authentic grasp of the content, and put me in a position to genuinely anticipate student difficulty. Furthermore, success is realised in students’ positive feedback about their overall confidence in DAS, related—I think—to our informed decisions about what to teach and how to organise the lessons and scaffold the tasks. True, we lacked confidence, but we had a ground-zero perspective on what needed to be taught, and at what point. Recall that one student described the subject’s assessment design, where larger assessments were broken into smaller tasks, as a useful step-by-step approach, noting also how the assessment tasks appear to “all fall into place.”

In terms of the support needed, I think now about some considerations for future iterations of the subject and future research. Ongoing access to content experts would be ideal, but related—which is more challenging to obtain—is the time for this consultation to happen during the thirteen weeks of the subject, and

the flexibility of the schedule to implement curriculum changes dynamically. This is near impossible at my university, where curriculum is necessarily approved months before delivery. Going back to the idea of a supporting colleague, this could be a person that guides teachers doing the work of interdisciplinarity to reflect on what they are doing, to ensure there is no imbalance. This may be as straightforward as a peer reviewer who works with the teachers during the implementation of the subject, but again, carving out the space for “review” is the most significant challenge.

## CONCLUSIONS

This article explains an interdisciplinary approach in the School of Arts. Whilst this is a modest case study at one university in Australia, the insights are internationally relevant in so far as interdisciplinarity continues to be a global issue in HE.

There are many considerations for HE teachers when taking an interdisciplinary approach to subjects (RQ1). Existing research notes, for example, confidence, professional development, and resourcing. Also explained is the need for mechanisms to enable workload acquittal for colleagues teaching in different disciplines/schools/faculties. From the case study examined here, a teacher’s identity and (related) their preconceived opinion of disciplines can impact their approach to content from disciplines other than their primary areas of research/expertise. In DAS, the teachers had some awareness of data analysis and held biased opinions, which influenced the curriculum design. Significant is the teachers’ awareness of the influence of their bias, yet their oversight of its impact during the subject. The importance, therefore, is the value of including in new interdisciplinary subjects opportunities for ongoing review.

Advantages and challenges of interdisciplinarity (RQ2) have already been noted. Key contributions in this article include teachers’ commitment—stemming from disciplinary bias and lack of confidence—to invigorating new disciplinary ideas for students through teaching activities, assessment design, and an emphasis on relevance. In DAS, this emphasis arose from the SCs’ implementation of a dialogic interdisciplinary model—one approach to the fifth model noted above. While this approach was successful (DAS students did not lack confidence with the interdisciplinary concepts, and teachers were pleased with their ability to go outside their comfort zone), a challenge that became apparent was disciplinary imbalance. A surprising problem that emerged from these teachers’ interdisciplinary approach was the oversight of the teachers’ own disciplines. A lesson, therefore, is for teachers not to overlook what they think they know, and to address this by anticipating one’s potential lack of confidence as well as the implications of what a lack of confidence may cause.

## END NOTES

- [1] The storytelling component of DAS is developed from the teachers' expertise teaching journalism and other forms of narrative non-fiction writing, including podcasting. Narrative non-fiction writing, also called narrative journalism, involves critical and creative thinking (assessing significance, credibility and validity of information, connecting facts) and audience analysis (Sheridan Burns, 2013). Significant also in this journalistic context of "storytelling" is ethics— notable here in terms of data ethics and privacy.
- [2] On her website, [danahboyd.org](http://danahboyd.org), boyd explains her decision not to use capital letters in her name.

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