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Beyond the Bunsen burner: science teacher portrayals in visual media as cultural artifacts shaping public understanding of science education

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Abstract

This paper examines science teacher portrayals in visual media as cultural artifacts that actively shape public understanding of science education. Drawing on Wartofsky's artifact theory, we conceptualize these portrayals at three levels: the media text as primary artifact, the constructed science teacher character as secondary artifact, and the expectations formed in viewers' minds as tertiary artifact. We develop an integrated theoretical framework combining cultural artifact theory, boundary mediation concepts, cultivation theory, and critical pedagogy to analyze a corpus of science teacher characters from television and film produced between 1990 and 2023, including *Breaking Bad*, *Lessons in Chemistry*, *The Walking Dead*, and *October Sky*. Our critical media analysis reveals three interconnected themes. First, the "heroic exception" pattern consistently

portrays science teachers demonstrating extraordinary competence in crisis situations while systematically omitting routine teaching practice. Second, science teacher characters function as cultural boundary figures, negotiating tensions between scientific expertise and social identity in ways that have evolved significantly over three decades toward greater complexity and diversity. Third, a substantial representation-reality gap exists between media portrayals and documented realities of science teaching, with implications for public expectations, teacher recruitment, and professional support. By analyzing these media texts as cultural artifacts performing significant cultural work, this study contributes to understanding the complex interplay between popular media, science education, and cultural formation, with implications for science teacher education and public engagement with science.

Keywords: Science teacher portrayals, Cultural artifacts, Visual media, Science education, Media representation, Cultural border crossing, Cultivation theory, Teacher Identity, Public pedagogy, Critical media analysis, Boundary figures

Introduction

In the pilot episode of *Breaking Bad*, high school chemistry teacher Walter White stands before his class, chalk in hand, delivering a lecture on the nature of chemistry. “Chemistry is the study of matter”, he intones to rows of disengaged teenagers, “but I prefer to see it as the study of change”. The scene is deliberately unremarkable – a middle-aged man in khakis, teaching to students who would rather be elsewhere, in a classroom distinguished only by its ordinariness. Yet within episodes, this same teacher will be synthesizing methamphetamine in a recreational vehicle, his chemical expertise transformed from classroom abstraction into survival currency. This transformation – from mundane pedagogue to extraordinary protagonist – encapsulates a pattern that pervades media representations of science teachers: the systematic elevation of scientific expertise into heroic competence, achieved precisely by extracting it from the contexts of actual teaching practice.

Such portrayals are not merely entertainment. They function as what [Wartofsky \(1979\)](#) termed *cultural artifacts* – human-created objects that both embody and transmit cultural meanings, shaping how societies understand themselves and their institutions. When millions of viewers encounter science teachers through screens rather than classrooms, these mediated representations become powerful forces in constructing public understanding of what science education is, who science teachers are, and what society should expect from them. As [Chang-Kredl and Colannino \(2017\)](#) observe, media portrayals of teachers create cultural scripts that influence public perception long before – and long after – direct classroom encounters.

This paper examines science teacher portrayals in visual media as cultural artifacts that actively participate in shaping societal understanding of science education. We position these media texts not as passive reflections of educational reality but as constitutive cultural products that encode particular values, reproduce or challenge dominant assumptions, and establish frameworks through which publics interpret the

enterprise of science teaching (Hall, 1997). In doing so, we address a significant gap in scholarship; while researchers have examined teacher portrayals broadly in film and television (Bulman, 2015; Dalton, 2017) and others have studied media representations of scientists (Haynes, 1994; Weingart, Muhl, & Pansegrau, 2003), the specific cultural work performed by science teacher characters – figures who uniquely mediate between scientific authority and pedagogical practice – has received insufficient attention.

Science teacher portrayals as cultural artifacts

To analyze science teacher portrayals as cultural artifacts, we draw on Wartofsky’s (1979) influential framework distinguishing three levels of artifacts. *Primary artifacts* are directly used in human activity – in our context, the films and television series themselves as material-cultural products circulating through media systems. *Secondary artifacts* are representations and interpretations of primary artifacts and the practices surrounding them – here, the constructed science teacher characters who embody particular configurations of expertise, identity, and social role. *Tertiary artifacts* constitute imaginative projections that can “come to color and change our perception of the actual world” (Wartofsky, 1979, p. 209) – the mental images, expectations, and assumptions about science teachers that form in viewers’ minds through sustained media exposure.

This three-tier conceptualization proves essential for understanding how media portrayals perform cultural work. A television series like *Lessons in Chemistry* (primary artifact) constructs Elizabeth Zott as a particular kind of science teacher figure (secondary artifact), and through viewers’ engagement with this character, contributes to broader cultural expectations about women in science, the relationship between domestic and scientific knowledge, and what constitutes legitimate science education (tertiary artifacts). These tertiary artifacts, as Cole (1996) elaborates, become part of the cultural toolkit through which subsequent generations interpret their encounters with actual science teachers and science education.

The cultural artifact lens reveals that media portrayals are never neutral transmissions of information about science teachers but are always already embedded in ideological structures. As Van Beveren, Rutten, Vandermeersche, and Verdoodt (2018) demonstrate in their analysis of school movies, such texts function as “pedagogical sites” where cultural assumptions about education are negotiated and contested. For science education specifically, these negotiations carry particular weight given long-standing tensions around scientific authority, public understanding of science, and questions of who has access to scientific literacy (Aikenhead, 1996).

The representation-reality gap

Central to our analysis is what we term the *representation-reality gap* – the systematic divergence between how science teachers appear in media and the documented realities of science teaching practice. Research consistently demonstrates that media portrayals of teachers emphasize extraordinary circumstances: the inspirational savior who single-handedly transforms disadvantaged students (Ahn & Leggo, 2019), the maverick who defies institutional constraints (McKay, Riley, King, Pelliccione, & Licence, 2023), or

the figure whose expertise proves decisive in crisis situations. What remains systematically absent are the mundane realities that constitute the overwhelming majority of teaching work: lesson planning, grading, administrative meetings, managing student disengagement, navigating bureaucratic demands, and the incremental, often invisible labor of building understanding over time (Nerlino, 2023).

This gap matters because, as cultivation theory demonstrates, sustained exposure to particular patterns of media representation shapes viewers' perceptions of social reality (Morgan & Shanahan, 2010). When science teachers consistently appear as extraordinary figures in extraordinary circumstances, publics may develop expectations misaligned with the actual conditions of science teaching – expectations that influence policy debates, career decisions, and the support (or lack thereof) that society provides to science educators (Ewing, Ewing, & Cooper, 2021). The representation-reality gap thus constitutes not merely an aesthetic choice but a cultural formation with material consequences.

Research questions and contribution

This study addresses the following central research question: *How do visual media portrayals of science teachers function as cultural artifacts that shape public understanding of science education, and what do these portrayals reveal about societal attitudes toward science, teaching, and knowledge?*

We pursue this question through three interconnected sub-questions:

1. What patterns characterize the portrayal of science teachers in crisis or non-routine situations, and how does this “heroic exception” framing construct expectations about science teacher competence?
2. How do science teacher characters negotiate the boundaries between scientific expertise and social identity, and how have these negotiations evolved from 1990 to 2023?
3. What aspects of science teaching practice are systematically absent from media portrayals, and what do these absences reveal about cultural attitudes toward the profession?

Through critical analysis of science teacher characters across a corpus of influential films and television series, we offer three contributions to cultural studies of science education. First, we develop an integrated theoretical framework that synthesizes cultural artifact theory, boundary concepts, cultivation theory, and critical pedagogy to analyze media representations of science teachers. Second, we document and interpret patterns in these representations, revealing how they construct particular understandings of scientific expertise, teacher identity, and the purposes of science education. Third, we analyze the cultural significance of what these portrayals omit, arguing that systematic absences are as revealing as what is depicted. In examining science teacher portrayals as cultural artifacts, we illuminate the complex interplay between popular media, science education, and the cultural imagination.

Literature review

Understanding how science teacher portrayals function as cultural artifacts requires synthesizing scholarship across multiple domains: research on teacher representations in media, studies of scientist portrayals and stereotypes, science teacher identity literature, cultural studies approaches to science education, and media effects research. This review integrates these streams to identify the specific gap that motivates our study: the under-examined cultural work performed by science teacher characters as figures who uniquely mediate between scientific authority and pedagogical practice.

Teacher portrayals in visual media

Scholarship on teacher representations in film and television has established that these portrayals constitute significant cultural texts shaping public understanding of education. Dalton (2017), in her comprehensive analysis of “the Hollywood curriculum”, demonstrates that films about teachers consistently recycle a limited set of narrative templates, with the “teacher-as-savior” trope proving particularly persistent. These narratives typically position teachers as heroic individuals who transform students’ lives through extraordinary personal commitment, often by defying institutional constraints and conventional pedagogical approaches. Bulman (2015) extends this analysis, showing how Hollywood representations of schools reflect and reinforce broader cultural narratives about meritocracy, class mobility, and the purposes of education.

Research reveals that media teacher portrayals cluster around recognizable archetypes. Ahn and Leggo (2019) identify patterns including the inspirational maverick, the authoritarian disciplinarian, and the eccentric outsider, noting that these images circulate culturally and shape expectations before students ever enter classrooms. McKay et al. (2023) explicitly connect teacher film narratives to Campbell’s (2004) “hero’s journey” structure, demonstrating how pre-service teachers themselves interpret their developing professional identities through this mythological lens. The hero framework, while potentially inspiring, systematically elevates individual exceptionalism over systemic factors in educational success.

Critically, scholarship documents a persistent gap between media portrayals and the documented realities of teaching practice. Ewing et al. (2021) trace what they characterize as increasingly negative and deteriorating portrayals of teachers on screen, arguing that media representations have shifted from idealized saviors to figures of ridicule or moral failure. Nerlino (2023) documents how media portrayals of teachers during the COVID-19 pandemic shifted dramatically “from heroes to scapegoats”, revealing the instability of public teacher imagery and its responsiveness to broader cultural anxieties. Van Beveren et al. (2018) demonstrate that school movies function as “rhetorical sites” where student-teachers negotiate professional expectations, suggesting that media portrayals actively participate in professional identity formation rather than merely reflecting existing attitudes.

Chang-Kredl and Colannino (2017) analyze constructions of “best” and “worst” teachers in online discourse, revealing how public narratives emphasize personal qualities – passion, caring, creativity – over professional knowledge or systemic support.

This emphasis on individual disposition over structural conditions characterizes media teacher portrayals more broadly and carries significant implications for how societies conceptualize teacher quality, preparation, and support. As [Penteado, Budin, and da Costa \(2022\)](#) argue in their analysis of the television series *Rita*, such portrayals can reinforce “traditional, feminised, and non-professionalised views” of teaching that undermine recognition of teaching as skilled professional work.

Scientists and science in media

Parallel scholarship has examined how scientists and scientific work appear in popular media, establishing patterns relevant to understanding science teacher portrayals. The Draw-A-Scientist research tradition, spanning five decades, provides compelling evidence that media exposure shapes children’s mental images of scientists. [Miller, Nolla, Eagly, and Uttal \(2018\)](#), in their meta-analysis of U.S. Draw-A-Scientist studies, document persistent stereotypes – scientists as white, male, lab-coated, and socially awkward – while noting gradual increases in drawings of female scientists that correlate with greater media representation of women in science.

Media portrayals of scientists have historically centered on the “mad scientist” archetype, though representations have evolved considerably. [Haynes \(1994\)](#) traces scientist representations from Faust through Dr. Strangelove, demonstrating how the figure of the dangerous genius has morphed across cultural moments while retaining core elements of social isolation and ambiguous ethics. [Weingart et al. \(2003\)](#) analyze scientists in fiction film, finding portrayals emphasizing “power maniacs and unethical geniuses” that position scientific knowledge as simultaneously essential and threatening. More recently, [Muscio \(2023\)](#) examine scientist portrayals in Marvel and DC superhero comics, documenting an “ambiguous role” where scientists appear as both heroes and villains, their expertise enabling either salvation or catastrophe.

Research demonstrates that such portrayals shape audience perceptions. [Leavy, Hourigan, and Cleary \(2023\)](#) found that Irish children’s drawings of scientists changed notably following the COVID-19 pandemic, incorporating more diverse imagery (vaccines, testing) while simultaneously reinforcing certain stereotypical indicators. [Lerner, Bonus, and Lynch \(2025\)](#) demonstrate that exposure to superhero television featuring villainous scientist characters reduces children’s epistemic trust in scientists, illustrating how narrative framing influences orientations toward scientific authority. [Thomson, Zakaria, and Radut-Taciu \(2019\)](#) confirm that children’s perceptions of scientists derive substantially from media rather than direct experience, with those citing media sources producing more stereotypical representations.

Gender and racial dimensions of scientist portrayals have received increasing attention. [Benson-Greenwald, Joshi, and Diekman \(2022\)](#) analyze profiles of scientists in *The New York Times* and *The Scientist*, finding that portrayals emphasize agency over communality regardless of scientist gender, potentially limiting identification for those who value relational orientations. [Braden \(2020\)](#) examines students’ metacommentary on the “racialized and gendered science nerd trope”, revealing how stereotypical imagery shapes who students perceive as belonging in science. [Eom et al. \(2025\)](#) demonstrate that race and gender biases persist in public perceptions of scientists’

credibility, with Black female scientists facing compounded disadvantages in perceived warmth and competence.

Science teacher identity

Understanding media portrayals of science teachers requires engagement with scholarship on science teacher identity – how individuals construct, negotiate, and enact professional selves that integrate scientific expertise with pedagogical commitment. [Beijaard, Meijer, and Verloop \(2004\)](#), in their influential review, conceptualize teacher professional identity as ongoing, dynamic, and constituted through interaction between personal and contextual factors. Identity is not fixed but continuously negotiated through practice, discourse, and social recognition.

Science teacher identity scholarship reveals particular tensions arising from dual positioning as both scientist and teacher. [Chung-Parsons and Bailey \(2019\)](#) demonstrate that preservice secondary science teachers perceive their science identity and teacher identity as hierarchically rather than fluidly related, with teacher identity typically primary and science identity activated mainly during content delivery. This finding challenges assumptions that science teachers seamlessly integrate expert and pedagogical roles, suggesting instead ongoing negotiation between potentially competing identity commitments.

[Rushton and Reiss \(2021\)](#), in their systematic review applying social identity theory to science teacher identity, argue that group membership and shared professional identity significantly influence how science teachers understand their roles. They emphasize that identity formation occurs within communities of practice where meanings of “science teacher” are collectively constructed and contested. [Molander and Hamza \(2018\)](#) examine identity transformation in short-track science teacher education programs, documenting how scientists transitioning to teaching navigate challenging identity shifts through phases of “cautious acceptance, rejection, and eventual integration” of pedagogical values.

Research increasingly emphasizes the dynamic, evolving nature of science teacher identity. [Hathcock, Garner, and Kaplan \(2020\)](#) examine “micro-changes” in science teachers’ identities, showing how professional development can prompt shifts in beliefs and practices when new approaches align with existing role identities. [Zhang and Wang \(2021\)](#), in their bibliometric analysis of twenty years of teacher identity research, identify growing attention to sociocultural perspectives that situate identity within cultural, institutional, and historical contexts rather than treating it as purely individual psychological phenomenon.

Identity negotiation occurs within cultural contexts that shape what it means to be a science teacher. [Huang and Asghar \(2018\)](#) examine science education reform in Taiwan, demonstrating how Confucian learning cultures both support and constrain inquiry-based approaches, influencing how teachers negotiate scientific and pedagogical identities. [Askew and Wade-Jaimes \(2022\)](#) explore science identity formation in urban settings, revealing how race, educational discourse, and administrative recognition intersect to shape teachers’ developing professional selves. These studies confirm that science teacher identity cannot be understood apart from the cultural contexts – including media contexts – within which it is formed and enacted.

Cultural studies approaches to science education

Cultural studies perspectives fundamentally reframe science education as cultural practice rather than neutral transmission of objective knowledge. This reframing proves essential for analyzing media portrayals as cultural artifacts that participate in constituting what science education means within particular societies.

Aikenhead's (1996) concept of "cultural border crossing" provides foundational vocabulary for understanding science learning as movement between cultural worlds. Aikenhead argues that for many students, science education requires crossing from everyday culture into the "subculture of science", with its distinct values, language practices, and ways of knowing. This crossing may be smooth for students whose home cultures align with scientific culture, but hazardous for those experiencing significant cultural distance. Science teachers, in this framework, function as "culture brokers" who facilitate (or impede) students' border crossings.

Costa (1995) extends border crossing analysis through typology of students' orientations toward science culture, ranging from "potential scientists" who move easily between worlds to "outsiders" for whom science remains foreign territory. The cultural border crossing framework has been productively applied across diverse contexts. Sánchez Tapia (2020) examine Nahua secondary students' experiences, demonstrating how contextualized curricula integrating traditional indigenous knowledge facilitate more successful border crossing. Seehawer and Breidlid (2021) argue for "dialogue between epistemologies" in Sub-Saharan African classrooms, framing quality science education as integration of indigenous and Western knowledge systems rather than replacement of one by the other.

Robles-Piñeros, Ludwig, Baptista, and Molina-Andrade (2020) conceptualize science classrooms as "trading zones" where traditional and academic knowledge systems meet, drawing on Galison's philosophy of science to theorize productive intercultural exchange. Galili (2021) proposes understanding scientific knowledge itself as "culture", arguing that effective science education requires treating content not as decontextualized facts but as cultural knowledge embedded in historical and philosophical contexts.

Stuart Hall's theory of representation provides crucial tools for analyzing how media portrayals constitute cultural meanings. For Hall (1997), representation is not merely reflective but constitutive – media images actively produce meanings through systems of signs, codes, and conventions rather than simply mirroring pre-existing realities. Applied to science teacher portrayals, Hall's framework directs attention to how specific representational choices construct particular understandings of science, teaching, and their relationship.

Raymond Williams' cultural theory, particularly his analysis of "structures of feeling" and distinctions between dominant, residual, and emergent cultural forms, illuminates how media portrayals relate to broader cultural formations (Williams, 1977). Blackman (2022) and Menter (2022) demonstrate Williams' continued relevance for educational analysis, showing how his frameworks capture the contested, dynamic nature of educational meanings within societies. Media portrayals of science teachers can be understood as participating in ongoing cultural negotiations over the meaning and value of science education.

Media effects and public pedagogy

Understanding how media portrayals function as cultural artifacts requires engagement with scholarship on media effects and the concept of public pedagogy – learning that occurs through cultural sites beyond formal educational institutions.

Cultivation theory, developed by George Gerbner and colleagues, provides empirical grounding for claims about media influence on perception. [Morgan and Shanahan \(2010\)](#) synthesize decades of cultivation research, demonstrating that sustained exposure to television shapes viewers’ perceptions of social reality, with heavy viewers more likely to perceive the world in ways consistent with television’s recurring patterns. [Morgan, Shanahan, and Signorielli \(2015\)](#) extend cultivation analysis to contemporary media environments, and [Hermann, Morgan, and Shanahan \(2023\)](#), in their meta-analysis of cultivation effects in social media contexts, confirm that cultivation processes operate across platforms, with content-specific exposure producing stronger effects than general media use.

Applied to educational contexts, cultivation theory suggests that repeated exposure to particular teacher portrayals shapes expectations about what teachers are and should be. [Baruah, Somandepalli, and Narayanan \(2022\)](#) demonstrate through computational text analysis that entertainment media significantly influences perceptions of various professions, including educators, by establishing sentiment trends and cultural narratives that persist in public consciousness. [Li, Guo, and Zou \(2022\)](#) find that exposure to profession-related content on social media shapes professional identity formation, with audiences functioning as both receivers and disseminators of professional imagery.

The concept of public pedagogy extends pedagogical analysis beyond classrooms to encompass learning occurring through popular culture, media, and other cultural sites. [Giroux \(2004\)](#) argues that cultural texts “teach” audiences through the representations, narratives, and subject positions they offer, often more effectively than formal education because entertainment evades critical scrutiny. [Sandlin, Schultz, and Burdick \(2010\)](#) synthesize public pedagogy scholarship, documenting diverse cultural sites – from shopping malls to television programs – that function pedagogically in shaping identities, values, and social understandings.

Entertainment-education research demonstrates how narrative media shapes attitudes and behaviors. [Green and Appel \(2024\)](#) analyze “narrative transportation”, the immersive engagement with stories that reduces resistance to embedded messages and facilitates attitude change. [Murphy and Phelps \(2022\)](#) review entertainment-education interventions, confirming that role modeling in narrative contexts can effectively influence audience beliefs and behaviors. [Wilke, Green, and Cooper \(2020\)](#) demonstrate entertainment-education effects in educational contexts specifically, finding that dramatizations addressing teacher behavior produced measurable attitude changes among viewers.

[Marquis, Johnstone, and Puri \(2020\)](#) examine student and faculty responses to media representations of higher education, finding that even when audiences characterize films as “just entertainment”, representations subtly shape perceptions of educational institutions and practices. This finding underscores that media portrayals

function pedagogically regardless of audience members’ conscious awareness or critical distance.

Synthesis: science teachers as understudied cultural figures

This review reveals a significant gap at the intersection of these scholarly streams. While research has examined teacher portrayals broadly, scientist representations extensively, science teacher identity deeply, and media effects rigorously, the specific cultural work performed by science teacher characters in visual media remains under-examined. Science teachers occupy a unique cultural position distinct from both “teachers” generally and “scientists” as typically portrayed. They are figures who must negotiate between scientific authority and pedagogical accessibility, between expert knowledge and everyday understanding, between institutional roles and transformative aspirations.

Existing scholarship establishes that media portrayals shape public expectations (Morgan & Shanahan, 2010), that teacher portrayals emphasize heroic individualism over systemic factors (Dalton, 2017), that scientist stereotypes influence identification with science (Miller et al., 2018), and that science teacher identity involves ongoing negotiation between expert and pedagogical commitments (Chung-Parsons & Bailey, 2019). Yet we lack sustained analysis of how media constructs science teacher figures specifically, how these constructions relate to documented realities of science teaching, and what cultural work such representations perform in shaping public understanding of science education.

Furthermore, existing research has not adequately theorized science teacher portrayals as cultural artifacts operating at multiple levels – as media products, as constructed characters, and as sources of mental imagery that shapes expectations. Nor has scholarship systematically examined what media portrayals omit, treating absences as equally significant as presences for understanding cultural attitudes toward science teaching.

This study addresses these gaps by developing an integrated theoretical framework for analyzing science teacher portrayals as cultural artifacts and applying this framework to a corpus of influential visual media texts spanning three decades. In doing so, we aim to illuminate how popular media participates in constructing cultural understandings of science education, with implications for science teacher education, public engagement with science, and cultural studies of education more broadly.

Theoretical framework

The literature review reveals that understanding science teacher portrayals as cultural artifacts requires theoretical resources capable of addressing multiple dimensions simultaneously: the production and circulation of media representations, the boundary work these representations depict, the cumulative effects of exposure on public perception, and the ideological functions such representations perform. Rather than applying these theoretical traditions sequentially or in isolation, we develop an integrated framework that positions the *science teacher as cultural boundary figure* –

a conceptualization that synthesizes cultural artifact theory, boundary mediation concepts, cultivation theory, and critical pedagogy into a coherent analytical lens.

Core concept: the science teacher as cultural boundary figure

We propose that science teacher characters in visual media function as *cultural boundary figures* – representations that embody and negotiate the borders between different knowledge systems, social identities, and cultural domains. This conceptualization draws on but extends existing boundary theory by emphasizing the specifically cultural work performed by these figures in mediating between science and society within the cultural imagination.

The boundary figure concept captures what is distinctive about science teacher characters compared to either “teachers” or “scientists” as typically portrayed. Unlike general teacher figures, science teacher characters carry the cultural weight of scientific authority – they represent not merely pedagogical relationships but society’s relationship to scientific knowledge itself. Unlike scientist characters, they are defined by their commitment to making science accessible, translating expert knowledge across cultural boundaries. This dual positioning makes science teacher characters uniquely revealing sites for examining cultural attitudes toward science, education, and knowledge.

As boundary figures, media science teachers perform several forms of cultural work. They model how scientific expertise relates to everyday life, demonstrating whether science enhances or impedes social connection. They embody particular resolutions to tensions between institutional authority and individual agency, expert knowledge and democratic participation, objective method and personal meaning. They establish templates for who belongs in science and who can successfully navigate between scientific and other cultural worlds. Through repeated circulation, these boundary negotiations become sedimented in cultural consciousness, shaping expectations about science education and those who practice it.

Theoretical integration

Our integrated framework synthesizes four theoretical traditions, each contributing essential analytical capacity while gaining explanatory power through combination with the others. Figure 1 presents the visual model of this integration.

Cultural artifact theory: how representations are produced and circulate

Wartofsky’s (1979) theory of artifacts, elaborated by Cole (1996) within cultural-historical psychology, provides the foundational ontology for our analysis. Wartofsky distinguishes three levels of artifacts based on their relationship to human activity. Primary artifacts are tools directly used in production – in our context, the films and television series themselves as cultural products created through specific industrial processes and circulating through media systems. Secondary artifacts are representations of primary artifacts and the modes of action associated with them – here, the science teacher characters as constructed figures embodying particular configurations of expertise, identity, and practice. Tertiary artifacts are imaginative constructions

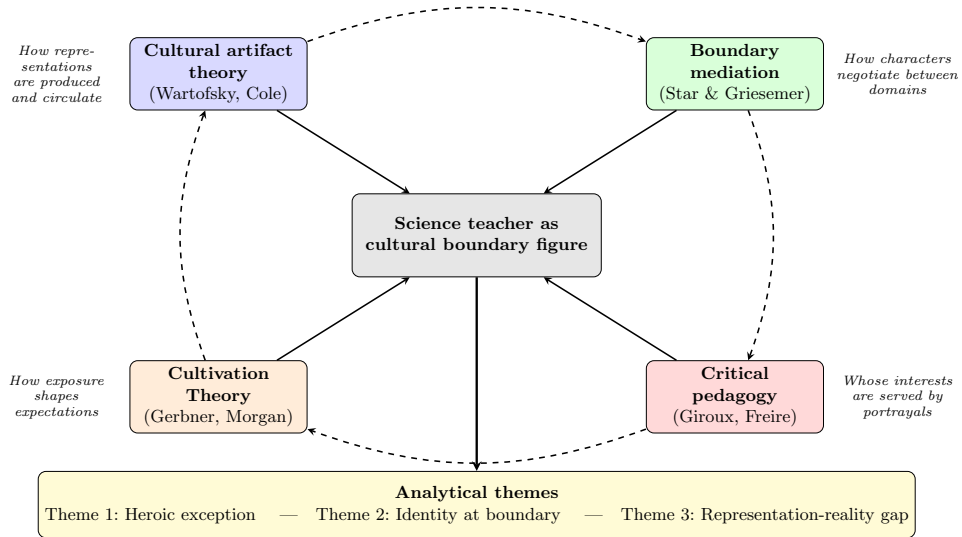


Fig. 1 Integrated theoretical framework: Science teacher as cultural boundary figure. Solid arrows indicate how each theoretical tradition contributes to the central concept; dashed arrows show inter-connections between traditions; the thick arrow indicates how the integrated framework generates the three analytical themes.

that transcend direct representation to constitute “relatively autonomous ‘worlds’ in which the rules, conventions and outcomes no longer appear directly practical” (Wartofsky, 1979, p. 208) – the mental models, expectations, and cultural scripts about science teachers that form in viewers through sustained engagement with media representations.

This three-tier framework is essential because it specifies *how* media portrayals perform cultural work. The movement from primary to secondary to tertiary artifacts traces a pathway of cultural influence: industrial production creates texts, texts construct characters, and characters generate imaginative frameworks that “come to color and change our perception of the ‘actual’ world” (Wartofsky, 1979, p. 209). As Engeström, Miettinen, and Punamäki (1999) elaborates, artifacts are not neutral tools but carry historically accumulated cultural meanings that shape the activities in which they are employed. Media representations of science teachers thus arrive already laden with cultural sediment – prior images, genre conventions, ideological assumptions – that constrain and enable particular constructions.

For our analysis, cultural artifact theory directs attention to the constructed nature of science teacher portrayals. Rather than asking whether representations are “accurate”, we examine how they are assembled from available cultural resources and what meanings they encode and transmit. This theoretical component primarily informs our corpus selection (identifying texts with sufficient cultural circulation to function as significant artifacts) and our attention to representation as active construction rather than passive reflection.

Boundary mediation: how characters navigate between domains

The concept of boundary objects, developed by [Star and Griesemer \(1989\)](#) to explain how cooperation occurs across social worlds with different perspectives, illuminates the mediating function of science teacher characters. Boundary objects are entities that “inhabit several intersecting social worlds” and “satisfy the informational requirements of each” while maintaining distinct meanings in different contexts ([Star & Griesemer, 1989](#), p. 393). Though originally applied to material objects (maps, specimens, standardized forms), the concept has been productively extended to roles, practices, and representations that facilitate coordination across difference ([Akkerman & Bakker, 2011](#)).

Science teacher characters function as representational boundary objects mediating between the social world of science (with its values of objectivity, expertise, and specialized knowledge) and everyday social worlds (with their emphasis on relationships, practical concerns, and accessible meaning). [Aikenhead \(1996\)](#) explicitly positions science teachers as “culture brokers” facilitating students’ border crossings between home cultures and science culture. Media representations visualize and dramatize this brokering function, showing characters navigating – with varying degrees of success – between expert knowledge and social belonging, institutional authority and personal connection, scientific detachment and emotional engagement.

[Carlile \(2002\)](#) distinguishes syntactic, semantic, and pragmatic boundaries requiring different forms of mediation. Science teacher characters in media typically negotiate all three: they translate scientific language into accessible terms (syntactic), interpret scientific meanings within everyday contexts (semantic), and demonstrate how scientific knowledge can be applied to practical problems (pragmatic). Crucially, media portrayals often collapse these distinct forms of boundary work, showing characters who move seamlessly across domains that actual science teachers experience as challenging to navigate ([Chung-Parsons & Bailey, 2019](#)).

For our analysis, boundary theory directs attention to how characters are positioned relative to different cultural domains and how their negotiations between domains are represented. This component primarily informs Theme 2 (Identity at the boundary), enabling systematic examination of how characters manage tensions between scientific expertise and social identity across the corpus.

Cultivation theory: how exposure shapes expectations

Cultivation theory, developed by George Gerbner and colleagues beginning in the 1960s, provides empirical grounding for claims about media influence on perception. The theory proposes that television (and by extension, other pervasive media) functions as a “cultural arm” of society, cultivating shared assumptions about social reality through the repeated patterns in its content ([Gerbner, Gross, Morgan, Signorielli, & Shanahan, 2002](#)). Heavy viewers, exposed to television’s symbolic environment over extended periods, come to perceive social reality in ways consistent with television’s recurrent representations – a process Gerbner termed “mainstreaming”.

[Morgan and Shanahan \(2010\)](#) emphasize that cultivation is not a simple stimulus-response process but involves the gradual shaping of assumptions that become

taken-for-granted background for interpreting experience. Cultivation effects are typically modest in magnitude but significant in their cumulative, long-term influence on cultural common sense. Recent meta-analyses confirm cultivation effects across contemporary media environments, including social media platforms (Hermann et al., 2023), suggesting the theory’s continued relevance despite media fragmentation.

Applied to science teacher portrayals, cultivation theory suggests that sustained exposure to particular patterns – heroic figures demonstrating extraordinary competence in crisis situations, for instance – shapes expectations about what science teachers are and should be. These cultivated expectations may then influence how publics evaluate actual science teachers, what support societies provide for science education, and who considers science teaching as a potential career. As Ewing et al. (2021) demonstrate, media portrayals of teachers correlate with public attitudes toward the profession, suggesting cultivation processes at work.

For our analysis, cultivation theory directs attention to recurring patterns across the corpus rather than unique features of individual texts. This component primarily informs Theme 1 (The heroic exception), enabling interpretation of why the consistent pattern of extraordinary competence in non-routine situations matters for public understanding, and Theme 3 (Representation-reality gap), framing absences as cultivating assumptions about what science teaching does not involve.

Critical pedagogy: whose interests are served

Critical pedagogy, drawing on the work of Freire (2005) and elaborated by Giroux (2004) and others, insists that education is never neutral but always embedded in relations of power. Educational representations similarly encode particular interests, naturalizing certain arrangements while obscuring alternatives. Critical pedagogy asks whose knowledge counts, whose voices are heard, and whose interests are served by particular educational configurations.

Applied to media analysis, critical pedagogy attends to ideological dimensions of representation. Kellner (1995) argues that media texts are “contested terrain” where dominant ideologies are encoded but may also be challenged or subverted. Representations of science teachers encode assumptions about scientific authority (who possesses legitimate knowledge), educational purpose (what science education is for), and social order (who belongs in science, who can teach, who can learn). These encoded assumptions may reinforce existing inequalities or open possibilities for transformation.

The concept of “public pedagogy” (Sandlin et al., 2010) extends critical pedagogical analysis beyond formal education to cultural sites where learning occurs informally. Media portrayals of science teachers function as public pedagogy, teaching audiences about science education whether or not viewers consciously register these lessons. This informal learning may be particularly powerful precisely because it evades the critical scrutiny applied to explicit instruction.

For our analysis, critical pedagogy directs attention to what representations normalize and what they marginalize, whose perspectives are centered and whose are absent. This component informs all three themes but particularly Theme 3

(Representation-reality gap), enabling interpretation of systematic absences as ideologically significant rather than merely narratively convenient.

Framework operationalization

Table 1 specifies how each component of the integrated framework guides particular analytical tasks, ensuring that theoretical resources are systematically deployed rather than merely invoked.

Table 1 Operationalization of integrated theoretical framework

Analytical task	Primary theoretical lens	Guiding questions	Application in analysis
Corpus selection	Cultural artifact theory	Which texts have sufficient cultural circulation to function as significant artifacts? What cultural resources do they draw upon?	Selection criteria emphasizing viewer-ship, cultural impact, genre representation
Character coding	Representation theory (Hall, 1997)	What signs and codes mark “science teacher”? How is expertise signified?	Identifying recurring representational strategies across corpus
Theme 1: Heroic exception	Cultivation theory and critical pedagogy	What patterns recur across texts? What expectations do these patterns cultivate? Whose interests are served by heroic framing?	Documenting crisis-competence pattern; interpreting ideological functions
Theme 2: Identity at boundary	Boundary mediation and identity theory	How do characters navigate between scientific and social domains? How are these negotiations resolved?	Mapping positions on expertise-identity matrix; tracking evolution over time
Theme 3: Representation-reality gap	Critical pedagogy and cultivation theory	What is systematically absent? What do absences naturalize? What assumptions do absences cultivate?	Comparing media elements to documented teaching realities; interpreting significance
Synthesis and implications	Integrated framework	How do themes interconnect? What cultural work do these representations collectively perform?	Connecting findings to science teacher education, public understanding

Framework synthesis

The four theoretical traditions combine synergistically within the cultural boundary figure conceptualization. Cultural artifact theory establishes that media portrayals are constructed products performing cultural work at multiple levels. Boundary theory specifies the distinctive work science teacher figures perform: mediating between scientific and everyday cultural domains. Cultivation theory explains the mechanism by which repeated exposure to particular boundary negotiations shapes cultural

expectations. Critical pedagogy ensures attention to whose interests these cultivated expectations serve and what alternatives they foreclose.

Together, these traditions enable analysis that moves beyond description of individual portrayals to interpretation of the cultural significance of recurring patterns, the ideological work performed by representational choices, and the implications for public understanding of science education. The framework positions science teacher portrayals not as mere entertainment or incidental representations but as consequential cultural artifacts actively participating in constituting what science education means within contemporary societies.

This integrated framework addresses a key criticism of the earlier version of this paper: that theoretical frameworks were mentioned but not systematically deployed. By specifying how each theoretical component guides particular analytical tasks (Table 1) and how the components interrelate within a unified conceptualization (Figure 1), we ensure that theory genuinely informs rather than merely decorates the analysis that follows.

Methodology

This study employs critical media analysis to examine science teacher portrayals across a corpus of influential visual media texts. Our methodological approach combines systematic content analysis with interpretive cultural analysis, guided by the integrated theoretical framework developed above. This section details our research design, corpus selection procedures, analytical methods, and strategies for ensuring trustworthiness.

Research design

We adopt a qualitative, interpretive research design grounded in critical media analysis traditions (Hall, 1997; Kellner, 1995). Critical media analysis moves beyond descriptive content analysis to examine how media texts produce meanings, encode ideological assumptions, and participate in cultural formation. This approach aligns with our theoretical framework’s emphasis on representation as constitutive rather than merely reflective of social reality.

Our design integrates two complementary analytical modes. First, we employ directed content analysis (Hsieh & Shannon, 2005) using categories derived from our theoretical framework to systematically identify patterns across the corpus. This ensures that analysis is theoretically grounded rather than purely inductive, addressing concerns about transparency in theme derivation. Second, we employ interpretive cultural analysis to examine selected scenes in depth, attending to visual codes, dialogue, narrative positioning, and contextual meanings that quantitative approaches cannot capture (Rose, 2016).

This combination of systematic pattern identification and interpretive depth responds to calls in cultural studies of science education for methodological approaches that are simultaneously rigorous and attentive to the complexity of cultural phenomena (Weinstein, 2008). Rather than claiming objectivity, we acknowledge our interpretive stance while maintaining transparency about analytical procedures that enable readers to evaluate our claims.

Corpus selection

The corpus comprises eight visual media texts featuring science teacher characters, spanning 1990 to 2023. Selection followed explicit criteria designed to identify texts functioning as significant cultural artifacts within the framework developed above.

Inclusion criteria

Five criteria guided corpus selection:

1. *Temporal range (1990–2023)*: This period encompasses significant shifts in science education discourse, including the rise of STEM initiatives, changing demographics of science teaching, and evolving media representations of educators. The timeframe enables analysis of how portrayals have evolved across three decades.
2. *Character centrality*: Selected texts feature science teacher characters as either protagonists or significant recurring figures rather than incidental background characters. This ensures sufficient representational material for analysis.
3. *Teaching depicted*: Characters must be shown engaged in teaching, applying pedagogical knowledge, or explicitly positioned as educators. This distinguishes science teacher figures from scientist characters who happen to explain concepts.
4. *Cultural impact*: Selected texts demonstrate significant cultural circulation through metrics including viewership/box office performance, critical recognition (awards, nominations), longevity (multiple seasons for television), and documented cultural influence (scholarly attention, popular discourse, parody/reference in other texts).
5. *Natural science focus*: Characters teach or have expertise in natural sciences (biology, chemistry, physics, general science) rather than mathematics, social sciences, or technology alone. This maintains coherence in the type of scientific authority represented.

Exclusion criteria

We excluded: (a) portrayals of university professors, who occupy a distinct cultural category with different expectations and representations; (b) scientist characters who never teach or apply pedagogical knowledge; (c) characters appearing in single scenes without narrative development; (d) documentary or reality television subjects, whose representational logic differs fundamentally from fictional construction; and (e) non-English language texts, acknowledging this as a limitation while ensuring analytical depth within available linguistic competence.

Selected corpus

Table 2 presents the final corpus with selection justifications.

The corpus offers variation across several dimensions relevant to our research questions: genre (drama, comedy, horror, superhero), medium (film, broadcast television, streaming), time period (1990s, 2000s, 2010s, 2020s), and character demographics (gender, age, teaching context). This variation enables examination of patterns that transcend particular genres or moments while remaining attentive to how representational strategies differ across contexts.

Table 2 Media corpus with selection justification

Title	Year(s)	Character(s)	Science domain	Selection justification
<i>October Sky</i>	1999	Freida Riley	Chemistry/ Physics	Academy Award-nominated film; widely used in educational contexts; portrays inspirational teacher supporting student against institutional barriers; significant cultural circulation in science education discourse
<i>The Faculty</i>	1998	Edward Furlong, multiple	Biology, General Science	Cult horror film subverting teacher authority tropes; science teachers as both threat and salvation; explicit engagement with science-as-authority themes
<i>Breaking Bad</i>	2008–2013	Walter White	Chemistry	16 Emmy Awards; widely regarded as landmark television; protagonist’s teacher identity central to narrative arc; extensive scholarly attention; iconic cultural status
<i>Mr. Young</i>	2011–2013	Adam Young	General Science	Canadian comedy series; 65 episodes across 3 seasons; represents comedic/youth-oriented genre; teacher as precocious genius trope
<i>The Walking Dead</i>	2010–2022	Eugene Porter	Biology/ General Science	177 episodes; massive global audience; science expertise as survival capital in post-apocalyptic context; complex evolution from deception to genuine contribution
<i>Lessons in Chemistry</i>	2023	Elizabeth Zott	Chemistry	Apple TV+ limited series; Emmy and Golden Globe nominations; explicitly addresses gender and science; chemistry teacher role through unconventional medium (cooking show)
<i>Ms. Marvel</i>	2022	Mr. Wilson	Physics	Marvel Cinematic Universe series; global Disney+ distribution; represents contemporary diverse casting; brief but significant role in protagonist’s development
<i>Never Have I Ever</i>	2020–2023	Mr. Shapiro	Biology	Netflix series; 4 seasons; explicit focus on academic achievement and science education; teacher-student dynamics in contemporary high school setting

Data sources

Primary data comprised the visual media texts themselves, accessed through streaming platforms and physical media. For systematic analysis, we utilized episode transcripts where available, supplemented by researcher-generated transcripts for scenes of particular analytical significance. Transcripts enabled keyword searching, systematic comparison across texts, and precise quotation, while repeated viewing of visual material ensured attention to non-verbal elements (setting, costume, gesture, framing) that transcripts cannot capture.

Secondary data included promotional materials, critical reviews, and existing scholarly analyses of selected texts. These materials provided context for understanding how texts were positioned culturally and how audiences and critics interpreted science teacher characters.

Analytical procedures

Analysis proceeded through four phases, as illustrated in Figure 2. This multi-phase approach ensures both systematic pattern identification and interpretive depth while maintaining transparency about how themes were derived.

Phase 1: Initial engagement and open coding

The first phase involved complete viewing of all corpus texts with attention to science teacher characters' appearances, dialogue, relationships, and narrative functions. During viewing, researchers engaged in open coding – identifying potentially significant moments, recurring elements, and initial impressions without imposing predetermined categories. Analytical memos documented emerging observations, questions, and preliminary interpretations. This phase produced character profiles summarizing each science teacher figure's key attributes, narrative trajectory, and representational features.

Phase 2: Directed content analysis

The second phase applied coding categories derived from the theoretical framework. Following Hsieh and Shannon (2005), directed content analysis uses theory to establish initial coding categories while remaining open to emergent codes that extend or challenge theoretical expectations. Our framework-derived categories included:

- *Expertise demonstrations* – scenes showing characters displaying scientific knowledge or competence
- *Teaching acts* – moments of explicit instruction, explanation, or pedagogical interaction
- *Boundary negotiations* – instances where characters navigate between scientific and social domains
- *Crisis situations* – non-routine contexts requiring application of scientific expertise
- *Identity markers* – signs coding characters as “science teacher” (costume, setting, language, props)
- *Relational dynamics* – interactions with students, colleagues, family, and community

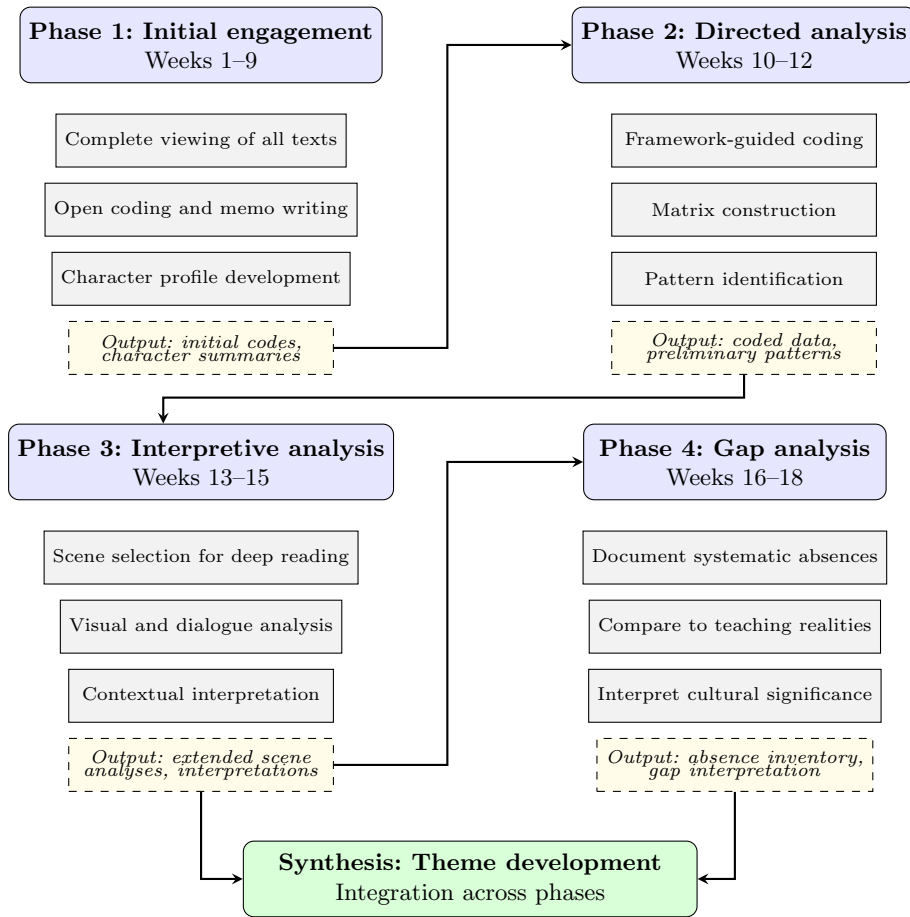


Fig. 2 Four-phase analytical process showing progression from initial engagement through directed analysis, interpretive analysis, and gap analysis to final synthesis.

Coded segments were organized into matrices enabling systematic comparison across characters and texts. Pattern identification involved examining distributions of codes, noting recurring combinations, and identifying variations across temporal periods and genres.

Phase 3: Interpretive cultural analysis

The third phase moved from systematic coding to interpretive depth. We selected key scenes for extended analysis based on their representational richness, their significance within character arcs, and their illustration of patterns identified in Phase 2. Extended scene analysis attended to:

- *Visual codes* – setting, framing, lighting, costume, props, and their cultural connotations

- *Dialogue* – language choices, registers, and what speech patterns signify about expertise and identity
- *Narrative positioning* – how scenes function within broader character and plot development
- *Intertextual resonance* – how scenes reference, echo, or subvert other media representations
- *Cultural context* – how scenes relate to broader cultural discourses about science and education

This interpretive phase drew explicitly on [Hall \(1997\)](#) encoding/decoding framework, examining how particular meanings are encoded through representational choices while acknowledging that audiences may decode these meanings in varied ways.

Phase 4: Gap analysis

The fourth phase systematically documented what media portrayals *omit*. We compiled an inventory of science teaching activities documented in research literature – including lesson planning, assessment, professional development, administrative duties, managing student behavior, navigating institutional constraints, and collegial collaboration ([OECD, 2019](#)) – and examined their presence or absence in the corpus. For absent elements, we analyzed whether omission reflected narrative economy (simply not relevant to story) or ideological function (naturalizing particular assumptions about science teaching). This phase operationalized our theoretical framework’s critical pedagogy component, treating absences as meaningful rather than incidental.

Theme development

The three analytical themes emerged through integration across phases. “The heroic exception” crystallized from Phase 2 patterns showing consistent emphasis on crisis competence combined with Phase 4 documentation of routine teaching’s absence. “Identity at the boundary” emerged from Phase 2 coding of boundary negotiations refined through Phase 3 interpretive analysis of how characters resolve expert-social tensions. “The representation-reality gap” developed directly from Phase 4 gap analysis interpreted through critical pedagogy’s attention to ideological functions of representation.

Importantly, theme development involved consolidation from a larger initial set of potential themes. Early analysis identified numerous patterns – gendered authority, institutional critique, pedagogical philosophy, student transformation, professional precarity, among others. We consolidated these into three overarching themes that could be analyzed with sufficient depth, with subsidiary patterns incorporated within the larger thematic structures. This consolidation addresses concerns about superficial treatment of too many themes by enabling extended analysis of fewer, more encompassing patterns.

Trustworthiness

We employed several strategies to enhance trustworthiness ([Lincoln & Guba, 1985](#)). *Prolonged engagement* involved multiple viewings of corpus texts across an extended analytical period, enabling deepening familiarity and refinement of interpretations. *Theoretical triangulation* applied multiple theoretical lenses to the same phenomena, with convergent interpretations strengthening confidence in findings. *Peer debriefing* involved regular discussion among research team members, challenging interpretations and exploring alternative readings. *Thick description* in the findings sections provides sufficient detail for readers to evaluate interpretive claims. *Reflexivity* involved ongoing attention to how our own positions as science educators shaped our readings, documented in analytical memos.

We do not claim that our interpretations are the only possible readings of these texts. Consistent with our theoretical framework’s acknowledgment that meaning is constructed rather than discovered, we offer interpretations grounded in systematic analysis and explicit theoretical commitments. Transparency about procedures enables readers to evaluate our claims and, where appropriate, to construct alternative interpretations.

Ethical considerations

As this study analyzes publicly available media texts rather than human subjects, formal ethical approval was not required. However, we attended to ethical dimensions of interpretive research, including fair representation of texts (avoiding selective quotation that misrepresents meaning), acknowledgment of interpretive limitations, and reflexivity about our own cultural positions relative to the representations analyzed.

Findings

Theme 1: The heroic exception

Across the corpus, science teacher characters consistently demonstrate extraordinary competence in non-routine, often crisis situations while routine teaching practice remains largely invisible. We term this pattern “the heroic exception” – the representational tendency to portray science teachers as exceptional figures whose expertise proves decisive in exceptional circumstances. This section examines how the heroic exception operates across the corpus, analyzes exemplary scenes in depth, considers complications to the pattern, and interprets its cultural significance.

Theoretical grounding

The heroic exception pattern illuminates how media representations cultivate particular expectations about science teacher competence. Cultivation theory posits that sustained exposure to recurring media patterns shapes viewers’ perceptions of social reality, with heavy viewers more likely to perceive the world in ways consistent with television’s symbolic environment ([Morgan & Shanahan, 2010](#)). When science teachers consistently appear demonstrating extraordinary expertise in crisis situations,

audiences may develop expectations that actual science teachers possess – or should possess – similar capacities for heroic intervention. These cultivated expectations, operating largely below conscious awareness, become part of the cultural common sense through which publics evaluate science education and those who practice it.

Critical pedagogy directs attention to the ideological work performed by heroic framing. Dalton (2017) demonstrates that the “teacher-as-savior” trope in Hollywood films consistently emphasizes individual exceptionalism while obscuring systemic factors in educational outcomes. When science teacher characters succeed through personal brilliance and determination, structural conditions – inadequate resources, unsupportive policies, societal inequities – fade from view. The heroic exception thus performs ideological work by locating educational success in individual teachers rather than in the systems that enable or constrain their practice. As Ahn and Leggo (2019) observe, such representations suggest that “good teaching” requires heroic individual effort rather than adequate institutional support.

Furthermore, the heroic exception pattern systematically absents routine teaching practice from representation. Lesson planning, grading, professional development, administrative meetings, managing student disengagement, navigating bureaucratic requirements – the activities that constitute the overwhelming majority of actual teaching work (OECD, 2019) – rarely appear on screen. This absence is not merely a narrative convenience but a representational choice with consequences. Following our theoretical framework’s attention to what representations naturalize, the systematic absence of routine teaching cultivates assumptions that such work is unremarkable, unworthy of attention, perhaps even unnecessary to what makes science teachers valuable. The heroic exception, in short, defines science teacher worth through extraordinary moments while rendering ordinary professional practice invisible.

Cross-case analysis: the crisis-competence pattern

The heroic exception manifests across the corpus through what we term the “crisis-competence pattern” – the repeated narrative structure in which science teacher characters demonstrate decisive expertise precisely when circumstances become extraordinary. Analysis reveals this pattern operating across genres, time periods, and character types, suggesting its deep embedding in cultural templates for representing science teachers.

Breaking Bad provides the most extensively developed instance. Walter White’s trajectory from unremarkable high school chemistry teacher to methamphetamine manufacturer literalizes the heroic exception: his scientific expertise becomes valuable – narratively compelling, economically profitable, personally transformative – only when extracted from the classroom and applied to crisis circumstances. The series’ celebrated pilot establishes this structure explicitly. Early scenes show Walter teaching to indifferent students in a drab classroom, his expertise unrecognized and under-compensated. His transformation begins when cancer diagnosis creates crisis, and his chemistry knowledge suddenly becomes survival capital. Across five seasons, Walter’s expertise enables him to navigate life-threatening situations – synthesizing explosives, improvising weapons, solving logistical problems – while his identity as teacher recedes

into backstory. The message encoded in this trajectory is stark: scientific expertise matters when it solves crises, not when it educates students.

The Walking Dead's Eugene Porter extends the crisis-competence pattern into post-apocalyptic terrain. Eugene initially claims expertise he does not possess, fabricating a story about being a scientist who can cure the zombie plague. This deception succeeds precisely because the survival group recognizes scientific expertise as valuable crisis capital – worth protecting, worth following across dangerous territory. When Eugene's deception is revealed, his subsequent arc involves proving genuine scientific value through crisis contributions: manufacturing ammunition, developing infrastructure, eventually creating the biological agent that helps defeat the Whisperers. Eugene's redemption comes not through teaching but through applying expertise to survival problems. His pre-apocalypse occupation as a high school science teacher appears only in brief reference; his value lies entirely in what his knowledge enables in extraordinary circumstances.

October Sky's Freida Riley exemplifies the heroic exception in inspirational teacher mode. Diagnosed with Hodgkin's disease, Miss Riley channels her remaining energy into supporting Homer Hickam's rocketry ambitions against institutional and familial resistance. Her heroism lies not in routine teaching but in exceptional advocacy – confronting the principal, encouraging Homer when others dismiss him, maintaining faith in his potential despite her own declining health. The film grants Miss Riley very few scenes of actual classroom instruction; her significance lies in transformative intervention at crucial moments. When she delivers her most quoted line – “Sometimes you really can't listen to what anybody else says. You just gotta listen inside” – she speaks not as teacher conveying curriculum but as heroic mentor offering life wisdom.

The Faculty inverts the heroic exception through horror genre conventions while ultimately reinforcing it. The film's science teachers initially appear as figures of mundane institutional authority before being revealed as hosts for alien parasites. Yet the resolution depends on scientific expertise: student characters must identify the aliens' biological vulnerabilities and synthesize a compound to defeat them. The science teacher who provides crucial knowledge (before succumbing to infection) and the students who apply biological reasoning to save their school both demonstrate that scientific expertise matters decisively in crisis. Even in horror subversion, the crisis-competence pattern holds.

Lessons in Chemistry's Elizabeth Zott presents a complex variation. Denied academic positions due to gender discrimination, Elizabeth becomes an unlikely science teacher through a television cooking show, where she insists on explaining chemical principles underlying recipes. Her heroism lies in defying expectations – teaching chemistry to housewives who have been told science is not for them, refusing to simplify or condescend, maintaining scientific rigor in a medium that expects entertainment. Elizabeth's teaching is extraordinary precisely because it occurs in extraordinary circumstances: not a classroom but a television studio, not enrolled students but a mass audience, not institutional sanction but transgressive intervention. The crisis-competence pattern operates through her defiance of the crisis of gender exclusion in science.

Extended scene analysis: Walter White's classroom

The pilot episode of *Breaking Bad* offers a particularly revealing scene for understanding how media constructs the heroic exception by first establishing what will be transcended. The sequence merits extended analysis.

The scene opens with Walter at a chalkboard, writing the chemical formula for a reaction while lecturing to his high school class. The visual composition emphasizes ordinariness: institutional fluorescent lighting, standard-issue classroom furniture, students arranged in rows. Walter wears a beige jacket over a green shirt – muted colors signifying his muted existence. He speaks with evident passion about chemistry's nature:

"Chemistry is the study of matter, but I prefer to see it as the study of change. Electrons change their energy levels. Molecules change their bonds. Elements combine and change into compounds. But that's all of life, right? It's the constant, it's the cycle. It's solution, dissolution. Just over and over and over. It is growth, then decay, then transformation".

The monologue is intellectually substantive – Walter demonstrates genuine expertise and even philosophical sophistication about his discipline. Yet the scene systematically undercuts this expertise's value in its educational context. Students are visibly disengaged: one files her nails, another stares out the window, a couple whispers in the back row. When Walter poses a question, silence follows. When he calls on a specific student, the response is sullen incomprehension. The scene encodes a clear message: Walter's expertise is real, but it is wasted here, unappreciated by students incapable of recognizing its value.

The sequence continues with Walter working a second job at a car wash, suffering the humiliation of washing a student's car while the student mocks him. This juxtaposition – profound chemical knowledge followed by menial labor and disrespect – establishes the injustice that Walter's subsequent transformation will address. His expertise deserves recognition, the narrative implies; the educational system fails to provide it.

What the scene absents is equally significant. We see no evidence of pedagogical craft – no differentiated instruction, no formative assessment, no scaffolding of concepts for struggling learners. Walter lectures; students fail to respond; the scene moves on. The possibility that effective teaching might engage these students, that Walter's pedagogical approach rather than student deficiency explains the disengagement, never surfaces. The scene naturalizes the assumption that teaching is merely the display of expertise, and that audience reception determines value.

This scene establishes the baseline from which Walter's heroic exception will depart. When he later teaches Jesse Pinkman to synthesize methamphetamine, the dynamic inverts: Jesse attends carefully, asks questions, follows instructions, and expresses genuine appreciation for Walter's knowledge. In the meth lab, Walter's teaching finds its worthy audience. The heroic exception is complete: scientific expertise achieves value not through routine classroom teaching but through extraordinary application to crisis circumstances.

Extended scene analysis: Eugene Porter’s redemption

The Walking Dead provides a contrasting scene that reinforces the heroic exception through a character whose scientific identity is complicated by deception. In Season 5 (episode 5 “Self Help”), Eugene confesses to the group that he is not, in fact, a scientist capable of curing the zombie plague:

“I’m not a scientist. I don’t know how to stop it. I’m not a scientist. I lied. I lied because I’m a coward, and I wanted to survive... I know I’m smarter than most people. I know I’m a very good liar, and I know I needed to get to D.C”.

The confession is devastating because it reveals that Eugene understood the crisis-competence logic perfectly: in a world where survival depends on useful skills, scientific expertise constitutes valuable capital worth fabricating. His subsequent seasons-long arc involves earning back trust by demonstrating genuine scientific competence – not through teaching but through manufacturing bullets, creating radio communications, and eventually developing the biological weapon that defeats the Whisperers.

A pivotal scene in Season 11 shows Eugene presenting his scientific contribution to the Commonwealth’s leadership. He speaks with technical precision about his innovations, and for the first time, an audience responds with recognition and respect. The scene parallels Walter White’s classroom but with outcomes inverted: where Walter’s students ignored expertise, the Commonwealth’s leaders value it. The difference lies not in Eugene’s knowledge but in the context of its application. Crisis circumstances make scientific expertise legible as valuable in ways that routine teaching, apparently, cannot.

Complications and counter-examples

The heroic exception pattern, while pervasive, admits complications that warrant acknowledgment. *Never Have I Ever*’s Mr. Shapiro represents a partial counter-example: a science teacher shown primarily in classroom contexts, engaging with students around academic concerns, without crisis circumstances elevating his role. Yet Mr. Shapiro functions largely as background character; the narrative does not grant him the development or screen time that would make routine teaching compelling. His presence suggests the possibility of representing ordinary teaching but also demonstrates why media typically does not: absent crisis, the science teacher lacks narrative function.

Mr. Young’s Adam Young, a teenage genius teaching high school science, complicates the pattern differently. The series acknowledges classroom teaching as its primary setting, with many episodes centered on lessons and student interactions. However, the premise itself constitutes heroic exception: Adam teaches not through professional preparation but through extraordinary innate genius. His competence is exceptional by definition, his situation unique rather than representative. The comedy genre permits attention to classroom settings that drama and horror typically bypass, yet still frames the science teacher as fundamentally exceptional.

Ms. Marvel’s Mr. Wilson offers a brief but intriguing complication. In his limited screen time, he appears as a supportive, competent teacher who encourages Kamala’s

scientific interests without crisis elevation or heroic intervention. His ordinariness, however, relegates him to the narrative margins; the heroic action belongs to the superhero protagonist, not her science teacher. Mr. Wilson suggests what representation of routine competence might look like while illustrating why such representation remains rare: ordinary competence, in media logic, is not narratively compelling.

Cultural interpretation

The heroic exception pattern reveals and reinforces cultural attitudes toward science teaching that have significant implications. By consistently locating science teacher value in extraordinary circumstances, media representations cultivate expectations misaligned with the realities of science education. Viewers may come to expect that effective science teachers demonstrate dramatic, decisive expertise rather than the patient, incremental work of building understanding over time. When actual science teachers engage in routine practice – planning lessons, assessing learning, adapting instruction – this work may seem unremarkable, even inadequate, compared to the heroic interventions that populate screens.

The pattern also obscures systemic dimensions of science education. When Walter White’s genius goes unrecognized, the problem appears to lie with indifferent students and inadequate compensation, not with educational structures, resources, or policies. When Freida Riley inspires Homer Hickam, individual mentorship rather than systemic support explains his success. The heroic exception consistently positions science education as a matter of individual teachers and students while rendering invisible the institutional conditions that enable or constrain their work. This framing aligns with neoliberal educational discourse that emphasizes individual accountability while defunding public support (Giroux, 2004).

Finally, the heroic exception establishes a problematic template for who might aspire to science teaching. If the role requires extraordinary heroism, who would pursue it as a sustainable career? The representation-reality gap documented in Theme 3 connects directly to the heroic exception: by absenting routine practice and elevating crisis competence, media portrayals construct science teaching as requiring exceptional individuals rather than supporting ordinary professionals to do important work. The implications for recruitment, retention, and public support for science education deserve serious attention.

Theme 2: Identity at the boundary

Science teacher characters in visual media consistently navigate tensions between scientific expertise and social identity, between institutional authority and transformative aspiration, between professional role and personal selfhood. We conceptualize these negotiations as occurring “at the boundary” – the representational space where characters mediate between the culture of science and everyday social worlds. This section examines how boundary negotiations are represented across the corpus, traces their evolution over three decades, analyzes exemplary scenes, and interprets patterns through the lens of identity theory and cultural border crossing.

Theoretical grounding

Boundary theory, originating in [Star and Griesemer's \(1989\)](#) analysis of how cooperation occurs across social worlds with different perspectives, illuminates the distinctive cultural position of science teacher characters. Unlike scientist characters who may remain within scientific culture, or teacher characters whose expertise lies primarily in pedagogy, science teacher figures must simultaneously inhabit and mediate between domains. They carry scientific authority while translating it for non-expert audiences; they represent institutional education while potentially challenging its limitations; they embody disciplinary expertise while navigating social relationships that may not recognize or value that expertise.

[Akkerman and Bakker \(2011\)](#) extend boundary theory to learning contexts, arguing that boundaries are not merely barriers but “sociocultural difference leading to discontinuity in action or interaction” ([Akkerman & Bakker, 2011](#), p. 133). Boundaries can be sites of difficulty, where movement between domains proves challenging, but also sites of potential learning and identity development. Science teachers, positioned at the boundary between scientific and everyday cultures, face both challenges and opportunities in this liminal space. Media representations dramatize these boundary negotiations, showing characters who navigate them with varying degrees of success.

Science teacher identity scholarship reveals that actual science teachers experience significant tensions in integrating scientific and pedagogical identities. [Chung-Parsons and Bailey \(2019\)](#) demonstrate that preservice science teachers perceive their identities as hierarchically rather than fluidly related, with teacher identity typically primary and science identity activated situationally. [Molander and Hamza \(2018\)](#) document how scientists transitioning to teaching navigate challenging identity transformations through phases of cautious acceptance, rejection, and eventual integration. [Rushton and Reiss \(2021\)](#) emphasize that science teacher identity is socially constructed within communities of practice where meanings are collectively negotiated. Media representations participate in this collective negotiation, offering templates for how scientific and pedagogical identities might be combined, prioritized, or held in tension.

[Aikenhead's \(1996\)](#) concept of cultural border crossing provides additional theoretical resources. Aikenhead frames science learning as movement between cultural worlds, with science teachers serving as “culture brokers” who facilitate students’ crossings. This framing positions science teachers as fundamentally liminal figures – neither fully of students’ home cultures nor fully of scientific culture, but mediating between them. Media representations visualize this liminality, showing characters whose social positioning reflects their boundary-dwelling status.

Cross-case analysis: expertise and social identity

Analysis across the corpus reveals a recurring tension between scientific expertise and social belonging. Science teacher characters frequently appear as figures whose specialized knowledge creates social distance, marks them as different, or complicates their relationships. The resolution of this tension – whether expertise and belonging prove compatible or conflicting – varies significantly across characters and has evolved over the corpus’s temporal range.

Breaking Bad's Walter White embodies the tension in its starkest form. His scientific expertise is established as genuine and substantial, yet his social position is one of emasculation and disrespect. Students ignore him, colleagues overlook him, his brother-in-law mocks him, and his family struggles financially despite his advanced degree. The series constructs scientific expertise and social recognition as fundamentally misaligned: Walter possesses knowledge that society undervalues when confined to educational contexts. His transformation into Heisenberg represents a violent resolution to this tension – claiming social power through criminal application of expertise rather than pedagogical practice. The message encoded is troubling: scientific expertise achieves social recognition only when extracted from teaching and applied to domains where power operates more directly.

The Walking Dead's Eugene Porter initially presents as a figure whose claimed scientific identity substitutes for social competence. Physically unprepossessing, socially awkward, and lacking survival skills valued in the post-apocalyptic world, Eugene's assertion of scientific expertise functions as his sole claim to group membership. When this claim is revealed as fabrication, his social position collapses entirely. His subsequent arc involves rebuilding both genuine expertise and social belonging, eventually achieving integration: by later seasons, Eugene is valued both for his scientific contributions and as a community member with meaningful relationships. Unlike Walter, Eugene's trajectory suggests expertise and belonging can be reconciled, though the path requires extended struggle.

October Sky's Freida Riley negotiates a different configuration. Her scientific expertise (chemistry and physics knowledge supporting rocketry) aligns with rather than conflicts with her social role as nurturing mentor. Miss Riley's boundary crossing moves in the opposite direction from Walter's: rather than expertise creating social distance, her knowledge enables deeper connection with Homer and validation of his aspirations. Yet this alignment comes at a cost the film does not fully examine: Miss Riley's expertise serves others' dreams rather than her own, and her terminal illness removes her from the narrative before tensions between her roles might surface. The inspirational teacher trope resolves expertise-belonging tensions by positioning the teacher's knowledge entirely in service of student transformation.

Lessons in Chemistry's Elizabeth Zott presents the most complex negotiation of expertise and social identity in the corpus. Her scientific expertise is unquestionable – she was a promising chemist before gender discrimination derailed her academic career. Yet this expertise consistently creates social friction: male colleagues dismiss or appropriate her work; the television studio expects entertainment rather than education; audiences initially resist her insistence on chemical terminology. Elizabeth's resolution is neither Walter's violent assertion nor Miss Riley's self-effacing service but a persistent refusal to choose between expertise and belonging. She demands recognition of her scientific identity while building community with the housewives who become her students. The series suggests that the expertise-belonging tension reflects systemic injustice rather than inherent incompatibility, and that transformation requires changing social structures rather than individual accommodation.

Evolution across decades

Tracking representations across the corpus’s temporal range reveals significant evolution in how science teacher identities are constructed and how boundary negotiations are resolved. Table 3 summarizes key patterns.

Table 3 Evolution of science teacher identity portrayals across decades

Period	Dominant pattern	Boundary resolution	Representative characters
1990s	Inspirational mentor; eccentric authority	Expertise serves student transformation; teacher’s own identity subordinated	Freida Riley (<i>October Sky</i>); <i>The Faculty</i> teachers
2000s–early 2010s	Anti-hero; identity crisis	Expertise and social identity in fundamental conflict; violent or tragic resolution	Walter White (<i>Breaking Bad</i>); Adam Young (<i>Mr. Young</i>)
Mid-2010s	Survival pragmatist; redemption seeker	Expertise as adaptation; identity rebuilt through demonstrated value	Eugene Porter (<i>The Walking Dead</i>)
2020s	Diverse professionals; systemic critique	Expertise and identity integration possible; barriers are structural not inherent	Elizabeth Zott (<i>Lessons in Chemistry</i>); Mr. Shapiro (<i>Never Have I Ever</i>); Mr. Wilson (<i>Ms. Marvel</i>)

The 1990s texts in our corpus construct science teachers primarily through the inspirational mentor template. *October Sky*’s Freida Riley and even *The Faculty*’s teachers (before alien possession complicates matters) appear as figures whose expertise exists to serve students. Identity tensions remain largely unexplored; the science teacher’s inner life, professional aspirations, or struggles with institutional constraints receive minimal attention. This pattern aligns with Dalton’s (2017) documentation of the teacher-savior trope dominant in 1990s educational films: teachers exist narratively to catalyze student transformation rather than as complex subjects in their own right.

The 2000s and early 2010s mark a significant shift toward darker, more conflicted representations. *Breaking Bad* (2008–2013) exemplifies the anti-hero turn in prestige television, constructing Walter White as a figure whose scientific identity becomes vehicle for moral descent. The series takes seriously the question of what happens to a science teacher whose expertise goes unrecognized, but answers it through criminality rather than professional development or systemic change. *Mr. Young* (2011–2013), though comedic, similarly centers identity contradiction: Adam’s teenage social needs conflict with his professional teaching role, generating humor from the impossibility of integration.

The mid-2010s, represented in our corpus primarily through *The Walking Dead*’s extended treatment of Eugene Porter, introduce redemption narratives where scientific identity must be earned rather than assumed. Eugene’s fabrication and subsequent genuine contribution trace a path from false to authentic expertise, with identity validated through demonstrated community value. This pattern reflects broader cultural

anxieties about expertise and authenticity in an era of “fake news” and declining trust in institutions.

The 2020s texts suggest an emerging pattern of greater diversity and more nuanced treatment of structural barriers. *Lessons in Chemistry* (2023) explicitly frames Elizabeth Zott’s struggles as systemic gender discrimination rather than individual failing, opening space for critique of scientific and educational institutions. *Never Have I Ever* (2020–2023) and *Ms. Marvel* (2022), while granting science teachers less screen time, present figures whose professional competence and social integration appear relatively unproblematic – Mr. Shapiro as supportive teacher, Mr. Wilson as encouraging mentor. These representations may signal movement away from the tortured-genius template toward more diverse and less pathologized constructions of science teacher identity.

The expertise-identity matrix

To systematically map how characters negotiate between scientific expertise and social identity, we developed the expertise-identity matrix presented in Figure 3. This analytical tool positions characters along two dimensions: the degree to which scientific expertise is foregrounded versus backgrounded, and whether social identity is portrayed as integrated with or in tension with professional role.

The matrix reveals several patterns. Characters with highly foregrounded expertise tend toward the “tension” end of the social identity axis – Walter White and early Eugene Porter exemplify this pattern, their scientific knowledge creating social friction rather than enabling connection. Characters positioned as “social mentors” – Miss Riley, Mr. Shapiro, Mr. Wilson – have expertise more backgrounded, their value lying primarily in relational and motivational functions rather than technical knowledge. Elizabeth Zott occupies a distinctive position: expertise highly foregrounded yet social identity increasingly integrated, achieved through persistent refusal to accept the tension as inevitable.

Character trajectories prove particularly revealing. Walter White’s movement from “conflicted expert” deeper into tension (becoming Heisenberg) represents one resolution: abandoning the integration attempt entirely in favor of power assertion. Eugene Porter’s trajectory moves oppositely: from conflicted positioning based on fabricated expertise toward genuine integration as his authentic knowledge earns social recognition. These contrasting arcs suggest media’s available templates for resolving expertise-identity tensions – tragic descent or redemptive integration – while also revealing what remains largely unrepresented: stable, sustainable integration achieved through ordinary professional practice rather than extraordinary circumstances.

Extended scene analysis: Elizabeth Zott’s kitchen chemistry

Lessons in Chemistry provides rich material for analyzing gendered negotiations of scientific authority at the boundary between expert knowledge and everyday life. A pivotal scene from the series’ midpoint merits extended examination.

Elizabeth prepares for her cooking show broadcast, surrounded by kitchen equipment that she has relabeled with chemical terminology: “sodium chloride” for salt, “acetic acid” for vinegar, “Maillard reaction” for browning. Her producer Phil pleads with her to simplify:

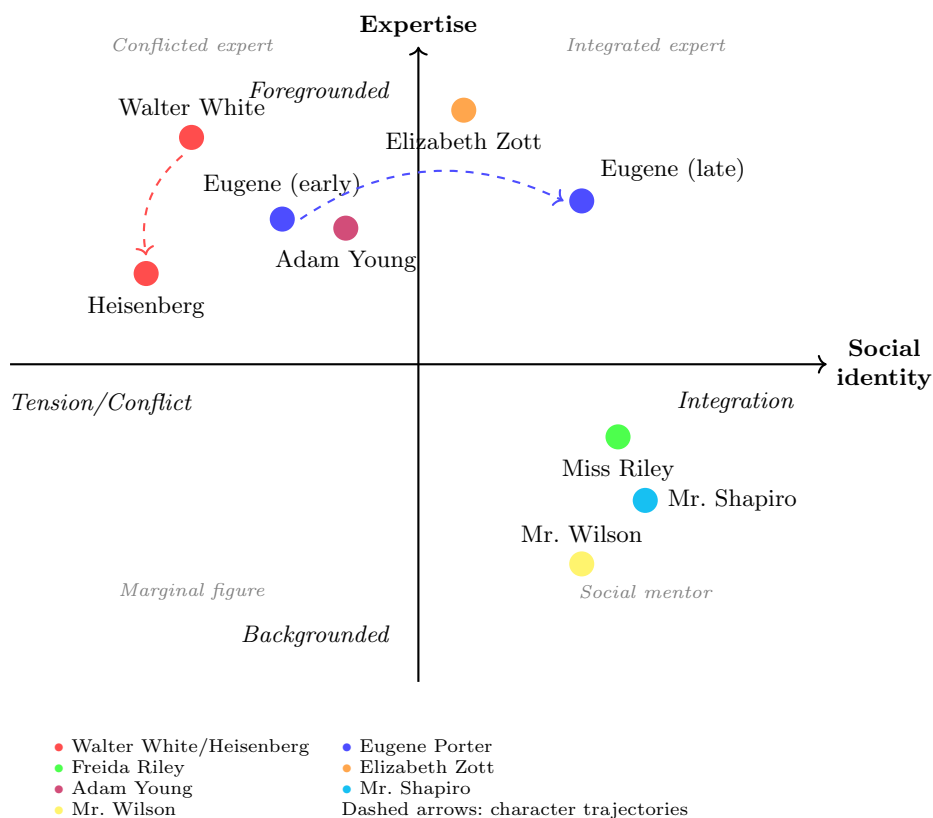


Fig. 3 Expertise-identity matrix mapping science teacher characters' positions relative to expertise foregrounding (vertical axis) and social identity integration (horizontal axis). Dashed arrows indicate character development trajectories across narrative arcs.

"Elizabeth, the sponsors are nervous. The housewives don't want a chemistry lesson. They want to know how to make dinner for their husbands".

Elizabeth's response is measured but unyielding:

"What they want is to be taken seriously. No one has ever told them they're capable of understanding chemistry. But they are. And when they understand *why* something works, they're not just following a recipe – they're thinking for themselves".

The scene crystallizes tensions that structure the entire series. Elizabeth refuses the boundary that would separate scientific expertise from domestic practice, insisting that chemistry *is* cooking, that housewives *are* capable scientists, that the kitchen *is* a laboratory. Her boundary crossing moves in the opposite direction from Walter White's: rather than extracting expertise from education to pursue power, she insists on bringing expertise into spaces from which it has been excluded.

The visual composition reinforces Elizabeth's boundary transgression. She wears a laboratory coat over her dress – scientific authority visually superimposed on feminine domesticity. The kitchen set combines professional laboratory equipment (beakers,

graduated cylinders, Bunsen burners) with domestic appliances. The studio audience, initially confused by her terminology, increasingly engages with her explanations, their faces showing recognition and curiosity rather than the boredom that characterized Walter White's classroom.

Elizabeth's gendered negotiation of scientific authority illuminates dimensions invisible in male-centered narratives. Where Walter's expertise went unrecognized due to institutional undervaluation of teaching, Elizabeth's expertise was actively suppressed – her research stolen, her career derailed, her contributions attributed to male colleagues. Her boundary crossing is not merely professional preference but political resistance, claiming space for women's scientific authority in domains (television, kitchen, domestic life) coded as feminine and therefore scientifically illegitimate.

The scene also demonstrates a distinctive resolution to the expertise-belonging tension. Elizabeth builds community *through* rather than despite her scientific insistence. The housewives who become her audience achieve recognition and self-respect through understanding chemistry; their appreciation for Elizabeth grows precisely because she refuses to condescend. Expertise and social connection prove mutually reinforcing rather than conflicting – but only because Elizabeth transforms the terms on which connection occurs rather than subordinating her expertise to existing social expectations.

Extended scene analysis: Eugene's fabrication and truth

A scene from *The Walking Dead* Season 5 episode 5 "Self Help" provides counterpoint for analyzing how masculine identity intersects with scientific authority claims. Following the collapse of the group's mission after Eugene's confession, Abraham physically assaults Eugene before walking away in disgust. Eugene lies bloodied on the ground, his fabricated identity shattered.

The scene's brutality reflects the stakes of boundary transgression. Eugene claimed to occupy the "integrated expert" position – scientific knowledge valuable to the community, earning him protection and belonging. His confession reveals he occupied no such position; his expertise was performance, his belonging contingent on a lie. The physical violence enacts what the group experiences as betrayal: Eugene exploited the cultural authority of science without possessing its substance.

Yet the scene also illuminates the impossible position Eugene navigated. Lacking survival skills valued in the post-apocalyptic world – physical strength, weapon proficiency, practical competencies – Eugene possessed only intellectual capacity. His fabrication responded to a genuine insight: the group needed scientific expertise, would value and protect someone who possessed it. His lie was simultaneously exploitation and aspiration, claiming an identity he wished he could authentically inhabit.

Eugene's subsequent seasons trace slow reconstruction of authentic expertise and belonging. He learns genuine skills, contributes meaningfully to community survival, and builds real relationships. By the series' conclusion, Eugene occupies the "integrated expert" position he once falsely claimed – but achieving it required extended demonstration of value through crisis contributions rather than routine competence. The narrative suggests that masculine scientific authority, once lost or exposed

as fraudulent, can only be rebuilt through exceptional performance, not ordinary professional practice.

Cultural interpretation

The identity boundary negotiations across the corpus reveal cultural ambivalence about scientific expertise and its relationship to social belonging. Characters who foreground expertise frequently experience social friction, suggesting cultural assumptions that scientific knowledge marks one as different, perhaps threatening, certainly not ordinary. The recurring pattern of expertise-belonging tension naturalizes the assumption that scientific identity and social integration exist in zero-sum relationship – that one must choose between being a scientist and being socially connected.

The gendered dimensions of these negotiations prove particularly revealing. Male science teacher characters (Walter, Eugene, Adam) experience expertise-identity tensions as internal conflicts between aspects of selfhood. Female characters (Elizabeth, Miss Riley) experience these tensions as externally imposed barriers – discrimination, diminishment, appropriation. This gendered difference encodes cultural assumptions about who legitimately possesses scientific authority: for men, the question is how to deploy expertise; for women, the prior question is whether expertise will be recognized at all.

The evolution toward more integrated representations in 2020s texts offers cautious grounds for optimism. Elizabeth Zott's insistence that expertise and belonging can coexist, Mr. Shapiro and Mr. Wilson's unproblematic professional competence, and explicit attention to gender discrimination as systemic injustice suggest shifting cultural possibilities. Yet these representations remain partial and fragile – Elizabeth's integration requires constant struggle, the male teachers of color receive limited screen time, and the tortured-genius template retains cultural purchase.

For science teacher identity more broadly, media representations offer both limiting templates and transformative possibilities. The recurring expertise-belonging tension may shape how actual science teachers experience their professional identities, suggesting that their knowledge necessarily distances them from students and community. Yet representations like Elizabeth Zott demonstrate alternatives: scientific expertise as bridge rather than barrier, teaching as translation rather than transmission, boundary crossing as enrichment rather than diminishment. The cultural work of representation lies precisely in making such alternatives visible, imaginable, and potentially achievable.

Theme 3: The representation-reality gap

Media portrayals of science teachers are defined as much by what they omit as by what they depict. Across the corpus, systematic absences characterize representations: the routine practices that constitute the overwhelming majority of actual teaching work rarely appear on screen. This section documents these absences, compares media representations to documented realities of science teaching, and interprets the cultural significance of the representation-reality gap.

Theoretical grounding

Critical pedagogy directs analytical attention to absences as ideologically significant. Freire (2005) argues that what remains unspoken or invisible often reveals more about power relations than what is explicitly articulated. Giroux (2004) extends this insight to media analysis, demonstrating that cultural texts perform ideological work through exclusion as well as inclusion – what they naturalize as unremarkable, what they render invisible, what possibilities they foreclose. Applied to science teacher portrayals, critical pedagogy asks: whose interests are served by representing certain aspects of teaching while systematically omitting others?

The concept of “absent presence” from cultural studies illuminates how omissions function representationally. Elements consistently absent from representation become naturalized as unworthy of attention, as simply not part of what the represented phenomenon essentially is. When media consistently portrays science teachers in crisis situations while omitting routine practice, audiences may come to understand science teaching as essentially about crisis response rather than patient, incremental educational work. The absence becomes constitutive: it shapes understanding not by depicting alternatives but by rendering them invisible.

Cultivation theory provides a mechanism for understanding how systematic absences shape perception. Morgan and Shanahan (2010) emphasize that cultivation operates through the “pattern of messages” to which viewers are repeatedly exposed. These patterns include not only what is shown but what is consistently not shown. Heavy viewers develop assumptions about social reality based on television’s symbolic environment; when that environment consistently excludes particular elements, viewers may assume those elements are rare, unimportant, or nonexistent in the actual world. The systematic absence of routine teaching practice from science teacher portrayals thus cultivates assumptions that such practice is marginal to what science teaching genuinely involves.

Furthermore, the representation-reality gap connects to public pedagogy’s insight that media texts “teach” audiences informally. Sandlin et al. (2010) argue that public pedagogy often operates more effectively than formal education precisely because it evades critical scrutiny – audiences absorb lessons from entertainment without recognizing that learning is occurring. When science teacher portrayals consistently omit routine practice, audiences learn that such practice is unremarkable without consciously registering this lesson. The gap between representation and reality thus becomes sedimented in cultural common sense, shaping expectations about science teaching that may prove resistant to contrary evidence from actual experience.

Documenting systematic absences

Analysis across the corpus reveals consistent patterns of omission. Table 4 compares elements present in media portrayals to documented realities of science teaching practice, drawing on international research on teacher time use and professional activities (Ingersoll, May, & Collins, 2019; OECD, 2019).

Table 4 Representation-reality comparison: media portrayals versus documented teaching practice

Teaching activity	Documented reality	Media representation	Cultural implication of gap
<i>Lesson planning and preparation</i>	6–8 hours/week average; essential professional activity	Almost entirely absent; teachers appear to teach spontaneously	Teaching requires no preparation; expertise suffices
<i>Assessment and grading</i>	4–6 hours/week; significant professional burden	Rarely depicted; grades appear without process	Evaluation is automatic; student learning self-evident
<i>Administrative duties</i>	3–5 hours/week; meetings, paperwork, compliance	Virtually invisible; institutions appear only as obstacles	Bureaucracy is purely obstructive; management unnecessary
<i>Student disengagement and behavioral management</i>	Persistent challenge; major source of teacher stress	Briefly shown (Walter’s class) but not addressed pedagogically	Disengagement is student failure, not teaching challenge
<i>Differentiated instruction</i>	Essential practice for diverse learners	Never depicted; all students receive identical instruction	One teaching approach serves all students
<i>Professional development</i>	Required ongoing learning; credential maintenance	Completely absent from all corpus texts	Teachers arrive fully formed; no continued learning needed
<i>Collaboration with colleagues</i>	Significant component of professional practice	Rarely shown; teachers appear isolated	Teaching is solitary work; collaboration unnecessary
<i>Parent and community engagement</i>	Important professional responsibility	Minimal; Miss Riley’s parental confrontation exception	Schools operate independently of community
<i>Curriculum constraints</i>	Standards, mandated content, pacing guides	Never depicted; teachers have complete autonomy	Teachers control what they teach entirely
<i>Resource limitations</i>	Inadequate funding, outdated materials, large classes	Occasionally referenced but rarely shown affecting practice	Resources are available; limitations are individual failures

The OECD’s (2019) Teaching and Learning International Survey (TALIS) provides comprehensive data on how teachers actually spend their time. Across participating countries, teachers report spending substantial portions of their working hours on activities almost entirely invisible in media portrayals: planning and preparation, marking and assessment, general administrative work, communication with parents, and professional development. The TALIS data reveals that actual classroom teaching constitutes only about half of teachers’ total working time, with the remainder devoted to professional activities that media representations systematically omit.

Ingersoll et al. (2019) document the particular challenges facing science teachers, including shortages of qualified personnel, difficulties with student preparation and engagement, and inadequate resources for laboratory instruction. These systemic challenges – rarely attributable to individual teacher failings – receive minimal attention in

media portrayals, which tend to locate educational difficulties in student indifference or institutional obstruction rather than structural conditions.

Research on teacher stress and burnout further illuminates the gap between representation and reality. Madigan and Kim (2021), in their meta-analysis, identify workload, student behavior, and organizational factors as primary sources of teacher stress – precisely the elements absent from media portrayals. The heroic teacher trope, Nerlino (2023) argues, contributes to unrealistic expectations that actual teachers experience as burden: when society expects transformative impact from individual teachers, the ordinary challenges of professional practice become sources of perceived inadequacy rather than systemic issues requiring collective response.

Cross-case analysis of absences

Examining specific corpus texts reveals how systematic absences operate across genres and narrative contexts.

Breaking Bad's Walter White is shown teaching in only a handful of scenes across five seasons, despite teaching being his ostensible profession for the series' duration. These scenes uniformly emphasize student disengagement without exploring pedagogical responses: Walter lectures, students ignore him, the scene transitions elsewhere. Never do we see Walter planning lessons, grading papers, attending department meetings, calling parents, adjusting instruction for struggling students, or engaging in any professional activity beyond delivering content. His classroom appears as setting for demonstrating his wasted potential rather than as workplace requiring professional skill. The absence of routine practice reinforces the narrative logic that Walter's expertise deserves better application – criminal enterprise, implicitly, constitutes more appropriate use of his knowledge than the invisible labor of actual teaching.

The Walking Dead's Eugene Porter, despite backstory as a high school science teacher, is never shown teaching in pre-apocalyptic flashback. His expertise manifests entirely through post-apocalyptic application: manufacturing ammunition, building radio systems, developing biological weapons. Whatever routine teaching practice characterized his former career remains entirely unrepresented. The series could have shown Eugene drawing on pedagogical experience – explaining concepts to group members, scaffolding understanding, facilitating collective problem-solving – but instead portrays his knowledge as directly applicable technical skill requiring no pedagogical mediation. Teaching, apparently, left no trace on how Eugene shares knowledge.

October Sky's Freida Riley receives perhaps the most sympathetic portrayal of a science teacher in the corpus, yet her actual teaching remains largely invisible. We see her encouraging Homer, defending his rocketry ambitions, and confronting his father – mentor activities that occur outside classroom instruction. The few classroom scenes show her presenting content but not managing learning, assessing understanding, or navigating the challenges of teaching multiple students with diverse needs and interests. Miss Riley's value lies entirely in inspirational intervention; the routine work that makes such intervention possible goes unrepresented.

Lessons in Chemistry's Elizabeth Zott presents a complex case. Her "teaching" occurs through a cooking show rather than a classroom, and she explicitly rejects conventional pedagogical accommodation (refusing to simplify terminology, insisting on

chemical precision). In one sense, Elizabeth’s teaching is extensively depicted – we see her preparing explanations, anticipating audience responses, refining her approach. Yet this teaching occurs in extraordinary circumstances that bear little resemblance to actual classroom practice: no student assessment, no curriculum constraints, no differentiation for struggling learners, no institutional compliance requirements. The series celebrates Elizabeth’s pedagogical commitments while depicting a teaching context that exempts her from routine professional challenges.

Mr. Young acknowledges classroom contexts more extensively than other corpus texts, with many episodes centered on lessons and student interactions. Yet the comedic premise – a teenage genius teaching high school – renders routine practice irrelevant: Adam’s challenges arise from his age and social situation, not from professional demands of teaching. The series never depicts lesson planning, grading, or professional development because Adam’s genius makes such activities unnecessary for him. Routine teaching practice remains absent even when classroom teaching is narratively central.

Never Have I Ever and *Ms. Marvel* grant their science teachers minimal screen time, precluding extensive analysis of what their representations omit. Yet this marginality is itself significant: science teachers appear briefly to serve narrative functions (encouraging protagonists, providing academic context) before disappearing from view. Whatever professional lives Mr. Shapiro and Mr. Wilson lead beyond their interactions with protagonist students remains entirely unrepresented. The absence of routine practice aligns with the absence of the teachers themselves from sustained narrative attention.

Why routine practice disappears

The systematic absence of routine teaching practice from media portrayals reflects both narrative constraints and ideological functions. Understanding why these absences occur illuminates how representation and reality diverge.

Narrative constraints partially explain the gap. Lesson planning, grading, and administrative work lack dramatic interest; they involve repetitive activities, solitary effort, and incremental progress rather than the conflict, transformation, and resolution that narrative requires. Media texts, operating under commercial pressures to capture and retain audience attention, naturally gravitate toward representations with dramatic potential. The heroic exception (Theme 1) partly results from this narrative logic: crisis situations provide drama that routine practice cannot.

Yet narrative constraints do not fully explain systematic absences. Other professions receive media representation of routine practice: medical dramas depict paperwork and administrative challenges; legal dramas show research and preparation; police procedurals include bureaucratic obstacles. The near-total absence of routine teaching practice from science teacher portrayals suggests something beyond narrative economy at work.

We argue that ideological functions underlie these absences. Representing routine teaching practice would require acknowledging teaching as skilled professional work deserving systemic support. If audiences saw the hours teachers spend planning

lessons, the challenge of assessing diverse learners, the burden of administrative compliance, they might understand teaching as labor requiring adequate compensation, reasonable workloads, and institutional resources. The systematic absence of routine practice obscures teaching’s professional demands, enabling assumptions that teaching is relatively easy work performed by those who “can’t do” other things.

Furthermore, representing routine practice would complicate the heroic teacher narrative that [Dalton \(2017\)](#) documents as culturally pervasive. If effective teaching requires sustained professional effort rather than individual heroism, then educational improvement becomes a systemic rather than individual responsibility. The absence of routine practice sustains ideological frameworks that locate educational quality in exceptional teachers rather than in policies, funding, and structures that support ordinary professional practice.

The special problem of science teaching

Science teaching involves particular professional demands that media portrayals especially tend to omit. Laboratory preparation and safety management, equipment maintenance, material procurement, and the coordination of hands-on activities require substantial invisible labor. [Hofstein and Lunetta \(2004\)](#) document that effective laboratory teaching demands extensive preparation, ongoing monitoring, and careful post-activity processing – none of which appears in media representations of science teachers.

The corpus texts occasionally reference laboratory settings – Walter White’s high school lab, Eugene’s post-apocalyptic manufacturing spaces, Elizabeth Zott’s television kitchen-laboratory – but never depict the preparation such spaces require. Characters appear in equipped laboratories as if materials simply exist, safety protocols are unnecessary, and cleanup happens offscreen. This absence particularly distorts understanding of science teaching, which involves greater material infrastructure than many other subjects.

Science teaching also involves distinctive challenges with student preconceptions and conceptual change. Students arrive with intuitive theories about natural phenomena that often conflict with scientific understanding; effective science teaching requires eliciting, addressing, and transforming these preconceptions through carefully designed instruction ([Vosniadou, 2013](#)). None of the corpus texts depicts this essential work. Students in media representations either understand immediately (Elizabeth’s cooking show audience) or remain impervious to instruction (Walter’s high school students). The effortful, incremental process of supporting conceptual change – arguably the core work of science teaching – remains entirely unrepresented.

Cultural interpretation

The representation-reality gap carries significant implications for public understanding of science teaching and support for science education. When media consistently portrays science teachers in extraordinary circumstances while omitting ordinary professional practice, several consequences follow.

First, expectations become misaligned with reality. Publics may expect science teachers to demonstrate dramatic, decisive expertise while finding routine professional

competence unremarkable. Students entering science teaching may anticipate transformative impact while experiencing the patient, often frustrating work of actual teaching as disappointing or evidence of personal inadequacy. Parents and administrators may evaluate teachers against heroic templates that bear little resemblance to what effective teaching actually requires.

Second, the invisible labor of teaching remains uncompensated and undervalued. If media never depicts lesson planning, grading, and administrative work, these activities may seem minor additions to the “real” work of classroom teaching rather than substantial professional demands deserving recognition and support. Political and economic decisions about teacher compensation, workload, and resources occur within cultural contexts shaped partly by media representation; the absence of routine practice from that representation may contribute to underinvestment in teaching as a profession.

Third, systemic issues remain obscured. The representation-reality gap focuses attention on individual teachers rather than on structures that enable or constrain their work. When Walter White’s genius goes unrecognized, the problem appears to be student indifference rather than inadequate resources, excessive class sizes, or policies that undervalue science education. When Freida Riley inspires Homer, individual mentorship rather than systemic support explains his success. Media representations thus contribute to cultural frameworks that emphasize individual teacher quality while deflecting attention from the institutional conditions that produce educational outcomes.

Finally, the gap may affect recruitment and retention. If media portrayals cultivate expectations of heroic impact while actual teaching involves substantial invisible labor and routine challenge, those who enter teaching may experience disillusionment. [Ingersoll et al. \(2019\)](#) document that teacher attrition often stems from working conditions rather than inadequate compensation alone; the gap between expected and actual professional experience may contribute to decisions to leave teaching. Addressing science teacher shortages may require cultural work that includes more realistic media representation of what science teaching involves.

Discussion

This study examined science teacher portrayals in visual media as cultural artifacts shaping public understanding of science education. Applying an integrated theoretical framework combining cultural artifact theory, boundary mediation, cultivation theory, and critical pedagogy, we analyzed eight media texts spanning 1990 to 2023, identifying three interconnected themes: the heroic exception, identity at the boundary, and the representation-reality gap. This discussion synthesizes findings, articulates theoretical contributions, considers implications for multiple stakeholders, acknowledges limitations, and proposes directions for future research.

Synthesis of findings

The three themes identified in this analysis are not independent patterns but interconnected dimensions of a coherent cultural phenomenon: the construction of science

teachers as extraordinary figures whose value lies outside ordinary educational practice. Understanding how these themes interconnect illuminates the cultural work performed by science teacher portrayals.

The heroic exception (Theme 1) and the representation-reality gap (Theme 3) function as complementary mechanisms. The heroic exception elevates crisis competence as the defining marker of science teacher value; the representation-reality gap removes routine practice from view. Together, these patterns construct a vision of science teaching in which expertise matters only when circumstances become extraordinary, while the patient, incremental work that constitutes actual teaching disappears. The absence of routine practice enables the heroic exception by removing evidence that would complicate it: if audiences saw science teachers planning differentiated lessons, assessing diverse learners, and navigating institutional constraints, the heroic template would appear as the oversimplification it is.

Identity at the boundary (Theme 2) connects to both other themes by revealing how characters negotiate the tensions that heroic framing and representational absence create. Science teacher characters must reconcile scientific expertise with social belonging in a representational environment that consistently positions expertise as valuable only in extraordinary circumstances and renders ordinary professional practice invisible. The recurring pattern of expertise-belonging tension reflects and reinforces cultural assumptions that scientific knowledge creates social distance, that teaching represents a diminished application of expertise, and that integration requires either violent assertion (Walter White), extended redemption (Eugene Porter), or persistent struggle against systemic barriers (Elizabeth Zott).

Together, the three themes perform significant cultural work. They construct science teaching as requiring exceptional individuals rather than supporting ordinary professionals; they locate educational value in individual heroism rather than systemic support; they define scientific expertise through crisis application rather than pedagogical translation; and they naturalize the assumption that routine teaching practice is unremarkable, perhaps unnecessary, certainly unworthy of representation or recognition. This cultural construction has material consequences: it shapes expectations that actual science teachers experience as burden, influences policy debates about educational investment, and may affect who considers science teaching as a viable career.

The evolution documented across the corpus's temporal range offers grounds for cautious optimism. The movement from 1990s inspirational mentors through 2000s anti-heroes toward 2020s representations featuring greater diversity and explicit attention to structural barriers suggests shifting cultural possibilities. Elizabeth Zott's refusal to accept expertise-belonging tension as inevitable, the unproblematic professional presence of Mr. Shapiro and Mr. Wilson, and the explicit framing of gender discrimination as systemic injustice all gesture toward alternative representational templates. Yet these alternatives remain partial and contested; the heroic exception retains cultural purchase, routine practice remains largely invisible, and the representation-reality gap persists.

Theoretical contributions

This study contributes to cultural studies of science education through the development and application of an integrated theoretical framework. We consider how each framework component was illuminated by the analysis and how the overarching concept of science teacher as cultural boundary figure advances understanding.

Cultural artifact theory proved essential for conceptualizing how media portrayals perform cultural work at multiple levels. Wartofsky’s distinction among primary, secondary, and tertiary artifacts enabled precise analysis of how films and television series (primary artifacts) construct science teacher characters (secondary artifacts) that generate expectations and mental models (tertiary artifacts) shaping perception of actual science teachers. This three-tier framework revealed that media influence operates not merely through individual texts or characters but through the imaginative projections that sustained engagement cultivates. The analysis confirms Cole (1996)’s insight that artifacts carry historically accumulated meanings that constrain subsequent interpretation: science teacher portrayals arrive embedded in prior representational traditions (the mad scientist, the heroic teacher, the dangerous expert) that shape available constructions.

Boundary mediation theory illuminated the distinctive cultural position of science teacher figures. Unlike scientist characters who may remain within scientific culture or teacher characters whose expertise lies primarily in pedagogy, science teacher figures must mediate between domains – translating scientific knowledge for non-expert audiences, navigating between institutional authority and personal connection, reconciling expert identity with social belonging. The analysis extended boundary theory beyond its original application to material objects and professional practices, demonstrating its utility for analyzing representational figures who embody and negotiate cultural boundaries. The expertise-identity matrix (Figure 3) provides a tool for systematically mapping how characters position themselves relative to expertise and belonging, revealing patterns invisible in case-by-case analysis.

Cultivation theory provided the mechanism for understanding how representational patterns shape perception. The analysis documented recurring patterns – crisis competence, expertise-belonging tension, routine practice absence – that constitute the symbolic environment to which viewers are repeatedly exposed. Cultivation theory’s emphasis on cumulative, long-term effects rather than immediate impacts aligns with this study’s focus on cultural formation rather than individual text analysis. The finding that systematic absences may cultivate assumptions as effectively as explicit depictions extends cultivation theory’s application to what media does not show, complementing existing research focused on what appears on screen.

Critical pedagogy ensured attention to ideological dimensions of representation. The analysis revealed how science teacher portrayals serve particular interests: emphasizing individual heroism while obscuring systemic factors, locating educational value in exceptional teachers rather than adequate support, naturalizing assumptions that serve neoliberal educational frameworks. Critical pedagogy’s insistence on asking whose interests are served proved essential for interpreting why representations take the forms they do, moving analysis beyond description toward critique.

The overarching concept of *science teacher as cultural boundary figure* synthesizes these contributions. Science teachers in media function as figures who embody society's negotiations with scientific knowledge, who model how expertise and belonging might be reconciled, and whose portrayals teach audiences informally about the nature and value of science education. Positioning science teachers as boundary figures captures their distinctiveness: neither purely scientists nor purely teachers, they occupy liminal space where cultural attitudes toward science, education, and knowledge become visible and contestable.

Implications

This analysis carries implications for multiple stakeholders concerned with science education and its public understanding.

For science teacher education, findings suggest the value of critical media literacy as component of professional preparation. Preservice science teachers encounter media portrayals before, during, and after their formal preparation; these portrayals shape expectations about what teaching involves and what kinds of people become science teachers. Explicit attention to media representations – examining how they construct expertise, identity, and practice – could help preservice teachers develop critical distance from heroic templates and unrealistic expectations. Programs might engage candidates in analyzing science teacher portrayals, identifying patterns documented in this study, and reflecting on how these patterns relate to their developing professional identities.

For science education researchers, this study demonstrates the value of attending to cultural dimensions of science education that extend beyond classroom practice. Research on science teacher identity, recruitment, and retention might fruitfully incorporate analysis of cultural representations that shape public understanding of the profession. The theoretical framework developed here – particularly the cultural boundary figure concept and expertise-identity matrix – offers tools potentially applicable to other investigations of science education's cultural dimensions. Additionally, this study models integration of cultural studies methodologies with science education concerns, contributing to the interdisciplinary conversation that *Cultural Studies of Science Education* seeks to foster.

For media makers, findings illuminate responsibilities that accompany representational choices. The patterns documented here – heroic exception, expertise-belonging tension, routine practice absence – are not inevitable but reflect accumulated conventions that alternative choices might disrupt. Media creators seeking to portray science teachers might consider: showing routine practice alongside extraordinary moments; depicting expertise and social belonging as compatible rather than conflicting; representing the systemic factors that enable or constrain teaching effectiveness; and including diverse science teacher figures whose professional competence appears unremarkable precisely because it is ordinary rather than exceptional. The evolution toward more nuanced portrayals in recent texts suggests that audiences may be receptive to alternative templates.

For policy makers and the public, this analysis reveals how media representations may shape the cultural context within which educational policy is debated. If publics

expect heroic individual teachers rather than systemic support, policy frameworks emphasizing accountability over investment may appear reasonable. If routine teaching practice remains invisible, arguments for reduced workloads, adequate resources, and reasonable class sizes may lack cultural resonance. Addressing science teacher shortages and improving science education may require cultural work alongside policy change – including attention to how media representations shape public understanding of what science teaching involves and what it deserves.

Limitations

Several limitations constrain interpretation of this study’s findings. First, the corpus comprises English-language, predominantly Western media texts. Science teacher portrayals in other linguistic and cultural contexts may differ substantially; findings should not be generalized beyond the cultural sphere these texts represent. Cross-cultural comparative analysis, suggested below as a future direction, would illuminate the degree to which documented patterns reflect specifically Western cultural formations versus more widespread representational tendencies.

Second, the interpretive analytical approach, while appropriate for cultural studies inquiry, cannot claim the reliability associated with more standardized methods. Our interpretations, though grounded in systematic analysis and explicit theoretical commitments, remain contestable; other researchers might emphasize different patterns or interpret the same patterns differently. We have sought transparency about procedures and theoretical grounding to enable readers to evaluate our claims, but acknowledge that interpretive analysis produces situated knowledge rather than definitive conclusions.

Third, this study analyzes media texts without investigating audience reception. Cultivation theory posits that media exposure shapes perception, but how actual audiences interpret science teacher portrayals – whether they adopt, resist, or negotiate the meanings we have identified – remains unexplored. Viewers bring their own experiences, including direct encounters with science teachers, to their media engagement; these experiences may modify or override cultivated assumptions. Reception studies, suggested below, would complement textual analysis by examining how audiences actually respond to science teacher portrayals.

Fourth, the corpus, though selected through explicit criteria, necessarily excludes many relevant texts. Animation, international productions, streaming content from non-major platforms, and historical texts predating our temporal range might reveal different patterns. The eight texts analyzed provide sufficient material for identifying recurrent themes but cannot represent the full range of science teacher portrayals in visual media.

Finally, this study cannot establish causal relationships between media portrayals and public attitudes, professional identity formation, or educational policy. We have argued that representations perform cultural work and may shape understanding, but demonstrating specific effects would require different methodological approaches. The cultural significance we attribute to representational patterns reflects theoretical inference rather than empirical measurement of impact.

Future directions

This study opens several avenues for future research. *Audience reception studies* would complement textual analysis by investigating how viewers actually interpret science teacher portrayals. Do audiences recognize the heroic exception pattern? Do they develop expectations consistent with media representations? How do viewers with teaching experience interpret portrayals differently from those without such experience? Reception research could employ surveys, interviews, or experimental designs to examine how media exposure relates to attitudes toward science teaching.

Cross-cultural comparative analysis would illuminate the cultural specificity of patterns documented here. Do science teacher portrayals in Bollywood, East Asian cinema, Latin American television, or European media manifest similar patterns? Where representations differ, what cultural factors might explain the variation? Comparative research could reveal whether the heroic exception and representation-reality gap reflect universal narrative constraints or specifically Western cultural formations.

Longitudinal tracking of representation changes would enable assessment of whether the evolution documented in this study continues. If 2020s texts indeed signal movement toward more diverse and structurally aware portrayals, future research could track whether this trajectory persists, accelerates, or reverses. Longitudinal analysis might also correlate representational changes with cultural shifts in attitudes toward science, education, and expertise.

Intervention research could examine whether explicit attention to media representations affects preservice teacher identity development or public attitudes toward science teaching. If critical media literacy proves valuable in science teacher preparation, as we have suggested, research demonstrating its effects would support curricular inclusion. Similarly, research examining whether alternative representations shift public attitudes could inform media advocacy efforts.

Finally, *extension to related professional representations* could examine whether patterns documented for science teachers characterize portrayals of teachers in other subjects, scientists in non-teaching roles, or other professional figures who mediate between expert and public knowledge. Such extension would clarify whether the cultural boundary figure concept generalizes beyond the specific case examined here.

Conclusion

This study set out to examine how visual media portrayals of science teachers function as cultural artifacts shaping public understanding of science education. Through critical analysis of eight influential films and television series spanning three decades, we have documented recurring patterns that construct particular understandings of science teaching, scientific expertise, and the cultural position of those who educate others in science. The findings reveal that science teacher portrayals perform significant cultural work – work that extends far beyond entertainment to participate in constituting what science education means within contemporary societies.

Three interconnected themes characterize science teacher portrayals across the corpus. The *heroic exception* pattern consistently elevates crisis competence as the defining marker of science teacher value, showing characters whose expertise proves

decisive in extraordinary circumstances while routine teaching practice remains invisible. *Identity at the boundary* captures the recurring tension between scientific expertise and social belonging that characters must navigate, with resolutions ranging from tragic descent to redemptive integration to persistent struggle against structural barriers. The *representation-reality gap* documents systematic absences – lesson planning, assessment, professional development, collegial collaboration, institutional navigation – that constitute the overwhelming majority of actual teaching work yet rarely appear on screen. Together, these patterns construct science teaching as requiring exceptional individuals demonstrating heroic competence rather than ordinary professionals deserving systemic support.

The integrated theoretical framework developed for this analysis – positioning the science teacher as cultural boundary figure – offers conceptual resources for understanding these representations and their significance. Drawing on Wartofsky’s cultural artifact theory, we traced how media texts (primary artifacts) construct science teacher characters (secondary artifacts) that generate expectations and mental models (tertiary artifacts) shaping how publics perceive actual science teachers and science education. Boundary mediation theory illuminated the distinctive position of science teacher figures, who must navigate between scientific culture and everyday social worlds in ways that neither scientist nor general teacher characters require. Cultivation theory provided the mechanism for understanding how sustained exposure to recurring patterns shapes perception, while critical pedagogy ensured attention to whose interests these cultivated understandings serve.

The cultural boundary figure concept captures what is distinctive and consequential about science teacher portrayals. These characters embody society’s relationship to scientific knowledge, modeling how expertise might relate to everyday life, how scientific identity might coexist with social belonging, and what value science education holds within the broader culture. When media consistently portrays science teachers as heroic exceptions whose expertise matters only in crisis, when it depicts scientific knowledge as creating social distance rather than enabling connection, and when it renders routine professional practice invisible, these representations teach audiences lessons about science education that may prove resistant to contrary evidence from actual experience.

The implications extend to multiple domains. For science teacher education, critical media literacy emerges as a valuable component of professional preparation, helping preservice teachers develop critical distance from heroic templates and unrealistic expectations. For science education research, this study demonstrates the value of attending to cultural dimensions that shape the contexts within which teaching and learning occur. For media makers, findings illuminate how alternative representational choices might disrupt accumulated conventions, depicting science teachers whose routine competence appears valuable precisely because it is ordinary rather than exceptional. For policy debates, the analysis reveals how media representations may shape the cultural context within which educational investment is discussed, potentially contributing to frameworks that emphasize individual teacher accountability over systemic support.

The evolution documented across the corpus’s temporal range – from 1990s inspirational mentors through 2000s anti-heroes toward 2020s representations featuring greater diversity and structural awareness – suggests that representational change is possible. Elizabeth Zott’s insistence that scientific expertise and social belonging can coexist, the unremarkable professional presence of contemporary science teacher characters of color, and explicit attention to gender discrimination as systemic injustice all gesture toward alternative cultural possibilities. Yet these alternatives remain partial, and the heroic exception template retains considerable cultural purchase.

Ultimately, this study argues that how societies imagine science teachers matters for how they support science education. Media portrayals are not mere entertainment but cultural artifacts actively participating in constructing public understanding of what science teaching involves, who science teachers are, and what they deserve from the societies they serve. Attending to these representations – analyzing their patterns, interpreting their significance, and imagining alternatives – constitutes essential work for cultural studies of science education. The science teachers who appear on our screens shape expectations for the science teachers who stand in our classrooms; understanding this cultural dynamic is a prerequisite for transforming it.

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Ethics approval. This study analyzed publicly available media texts and did not involve human participants. Ethics approval was not required.

Data availability. The media texts analyzed in this study are commercially available through standard distribution channels. Analytical coding frameworks and

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