

Trends in AI Curriculum Materials: Insights from Data Mining a Teacher Marketplace

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Abstract

This study employs an explanatory sequential mixed-methods design to investigate the characteristics and predictors of the popularity of AI curriculum materials on TeachersPayTeachers.com (TpT), mapping their structure and identifying key drivers of adoption. Using data from the year 2023, we outline the characteristics of AI curriculum materials and then utilize regression and qualitative analyses to investigate the key drivers behind their popularity. Our findings show that plug-and-play formats—especially activities and worksheets—predominate TpT’s AI curriculum materials, while a rising shift toward concise “crash course” modules enriched with critical-thinking elements underscores a move toward lessons that are both highly accessible and intellectually engaging. Regression results indicate that higher downloads are significantly associated with subject areas such as Computer Science – Technology and language learning, high school grade levels, and worksheet formats, with free curriculum materials attracting substantially higher engagement. A qualitative case analysis further substantiates these results by demonstrating the efficacy of a concise, well-structured design featuring clear objectives, interactive assessments, and PDF formatting. This study provides the first comprehensive mapping of AI curriculum materials on TpT and identifies popularity drivers, suggesting these resources effectively address educators' need for ready-to-use, low-prep AI lessons that fit neatly into a single class period.

Keywords: AI curriculum materials; Teachers Pay Teachers (TpT); Adoption drivers; Online marketplaces; Explanatory sequential mixed-methods

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As AI becomes more embedded in classrooms (Guo et al., 2024; Crawford et al., 2023; Chiu, 2023), educators seek accessible and relevant AI-related teaching materials to support instructional needs (Druga et al., 2022). Teachers have traditionally relied on textbooks, district-approved curricula, and personally created curriculum materials as resources (McCutcheon, 1980). However, the widespread adoption of digital platforms has changed how teachers access and utilize instructional content. A national survey found that over 85% of American educators frequently use digital curriculum materials, with over three-quarters regularly supplementing their instruction with online materials (Tosh et al., 2020; Kaufman et al., 2020; Kaufman et al., 2018).

Online educational marketplaces like TeachersPayTeachers.com (TpT) have become vital venues where educators can independently publish their own materials (Siedel & Stylianides, 2018), as well as market, acquire, and download digital curriculum resources (Carpenter & Shelton, 2022). These platforms allow educators to use keyword searches to efficiently locate, select, and download lessons, activities, and supplementary curriculum materials, which are often available for a modest fee or even free of charge (Shelton et al., 2021). Notably, during the initial stages of the COVID-19 pandemic, TpT recorded a 20% year-over-year revenue increase, reflecting a heightened demand for teacher-created materials (Marcin, 2020).

While AI-related curriculum materials on TpT have grown substantially (Allman et al., 2024), little is known about their composition, focus, and use. There has been limited research systematically mapping AI curriculum materials trends or identifying the key characteristics that influence their popularity and adoption by teachers. Understanding how AI teaching materials are structured—across variables such as grade level, subject area, material type, file format, and cost—is a first step in contextualizing this emerging educational marketplace.

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Given the limited research on AI curriculum materials in online marketplaces, this study examines how AI curriculum materials are structured and utilized on TpT. We focus on providing a foundational mapping of their characteristics and driven predictors of their adoption. By offering a conceptual overview of AI curriculum materials on TpT, this study aims to support stakeholders—including educators, platform managers, and curriculum materials developers—in understanding the evolving educational marketplace, contextualizing future explanatory research on AI curriculum materials, and contributing to broader discussions on the role of for-profit online educational marketplaces in shaping AI-driven learning environments.

Literature Review

AI Curriculum Materials

Curriculum materials are essential resources that serve as a bridge between the intended curriculum and its implementation in the classroom, influencing both teaching practices and student learning outcomes. These materials encompass a wide range of resources, including textbooks, digital resources, teacher guides, and student activity books, which are used to plan, execute, and evaluate instructional processes (Manurung et al., 2023). They are not static but are actively interpreted and adapted by teachers to fit specific educational contexts and student needs, thus playing a crucial role in instructional design and delivery (Jukić Matić, 2024). These materials are designed to support the development of knowledge, skills, and attitudes necessary for achieving educational competencies, often requiring teachers to tailor them to align with the curriculum's broader goals (Manurung et al., 2023). In mathematics education, for instance, curricular materials are increasingly digital and are used to design and implement standards-based curricula that emphasize core mathematical concepts and skills (Pepin & Gueudet, 2018). As such, curricular materials are pivotal in mediating the teaching-learning

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process, providing a structured yet adaptable framework that supports both teacher professional development and student engagement (Chen, 2023).

AI curricular materials in educational contexts are designed to equip students with essential skills and knowledge to navigate an AI-driven world. These curricula typically encompass a range of components, including foundational AI concepts, applications (Li & Noori, 2024), their implications within various disciplines (Xie et al., 2024), and ethical considerations (Zhang et al., 2022). For instance, the *AI MyData* curriculum integrates machine learning and data science with an ethical orientation, engaging students through hands-on activities and personal data projects to enhance their understanding of AI's societal implications (Sanusi et al., 2024). Similarly, AI literacy education in secondary schools emphasizes collaborative, project-based learning, focusing on both basic and advanced AI concepts and assessing students across cognitive, behavioral, and ethical dimensions (Ng et al., 2024). Interdisciplinary approaches are also highlighted, as seen in a 36-week curriculum that connects AI with other subjects and includes both online and unplugged activities (Sabuncuoglu, 2020). AI curriculum often incorporate practical applications, such as teaching algorithms through block-based programming and using AI-driven tools for personalized learning experiences (Akram et al., 2022). The integration of AI into curricula is further supported by frameworks that emphasize computational thinking and system thinking, aiming to foster a comprehensive understanding of AI and its applications (Cai et al., 2023). AI curriculum materials are increasingly being designed to be inclusive and adaptable, utilizing various teaching tools and resources to cater to diverse learning environments and cognitive levels (Hudiah et al., 2024).

The integration of AI curriculum materials for teachers in educational settings is crucial. AI literacy is becoming essential as AI technologies increasingly permeate various aspects of life, necessitating that both teachers and students understand AI's workings and implications

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(Ravi et al., 2023; Zhang et al., 2024). Teachers equipped with AI skills can enhance their productivity and instructional capabilities, fostering a more engaging and effective learning environment (MacDowell et al., 2024; Perrotta & Selwyn, 2019). Programs like the *Day of AI* and the *MIT RAICA* curriculum have demonstrated that well-structured AI literacy curricula can significantly improve teachers' understanding and application of AI, thereby enhancing student engagement and learning outcomes (Breazeal et al., 2023). Co-designing AI curriculum with teachers from various disciplines ensures that the content is relevant and adaptable to different educational contexts, promoting interdisciplinary learning and critical thinking (Yau et al., 2022). Teacher training programs that incorporate AI tools, such as the *GenAI Teachable Machine*, provide hands-on experience, which is vital for developing practical AI skills and fostering critical thinking (Laru et al., 2024). AI-assisted curriculum development can create personalized learning experiences, addressing diverse learner needs and preparing students for an AI-driven future (Kasztelnik, 2024). Challenges such as the need for ethical guidelines, data privacy concerns, and the digital divide must be addressed to maximize AI's benefits in education (Meylani, 2024). Overall, AI curriculum materials are pivotal in preparing educators to navigate and teach in an AI-integrated world, ultimately enriching the educational landscape and equipping students with the skills necessary for future success (Black et al., 2024; Tarisayi, 2024).

Online Educational Marketplaces and TeachersPayTeachers

Online educational marketplaces have become an undeniable force in education today. They offer a practical, easy way for teachers to supplement curriculum on-demand (Shelton & Archambault, 2022; Sawyer et al., 2020). The marketization of education (Williamson, 2020) is increasingly intertwined with digital platforms that cultivate collaborative and innovative learning environments (Zhao, 2024). Platforms such as Times Educational Supplement (TES),

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Teachers Notebook, Houghton Mifflin Harcourt Marketplace, and Amazon Ignite have emerged as prominent sources of curriculum. These online hubs are widely regarded by preschool to 12th grade (P-12) educators as dependable repositories of teacher-created materials designed for classroom application (Sawyer et al., 2019; Hu et al., 2019; Opfer et al., 2016). Many teachers both purchase and sell curricular materials via online platforms. This phenomenon, often termed online teacherpreneurship (Shelton & Archambault, 2018), has experienced significant growth alongside the expansion of online educational marketplaces.

In 2006, the online educational marketplace TeachersPayTeachers.com was launched. According to Teachers Pay Teachers (2025), the platform now features over 7 million teacher-created lessons and has facilitated over 1 billion curriculum material downloads. It offers educators a dedicated venue to upload, share, and sell original classroom materials. Aguilar et al. (2022) reported that over 69% of transactions involve free curriculum materials downloads and that 92% of paid transactions are for items priced at \$5 or less. Furthermore, excluding free listings and downloads, Shelton and colleagues (2021) found that the average item price was \$4.38, with the average transaction amount totaling \$8.28.

Teachers frequently used TPT to gather and share classroom ideas, while TPT teacherpreneurs leveraged these online spaces to promote and sell their curriculum materials (Schroeder et al., 2019). In 2012, U.S. teacherpreneur Deanna Jump garnered attention as the first educator to earn one million dollars from selling her curriculum materials on TpT (CNN, 2012). The success of these teacherpreneurs highlights the strong demand for teacher-created curriculum materials and suggests that the widespread use of TpT has significantly influenced both educators' pedagogical practices and the curriculum experienced by students.

TPT AI Curriculum Materials

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Drawing on the work of Shelton and colleagues (Carpenter & Shelton, 2022; Shelton et al., 2019; Shelton et al., 2021; Shelton & Archambault, 2022; Shelton et al., 2023), we consider TpT AI curriculum materials as discrete, standalone instructional resources designed to support the teaching of AI-related content. These materials typically serve as supplementary components within a broader course, rather than forming a comprehensive curriculum. They appear in diverse formats—including activities, readings, worksheets, lesson plans, guides, and professional development modules—and are intended to target specific AI skills or concepts within educational practice.

While AI curriculum materials have proliferated, there remains little systematic research on their presence in online marketplaces. Allman et al. (2024) found that AI curriculum materials on TpT nearly tripled in 2023 compared to 2022, reflecting a growing interest in AI within education. This rapid expansion highlights the need to map how these curriculum materials are structured in terms of key attributes such as grade level, resource type, subject, file type, cost, and downloads. A clear understanding of these attributes provides a baseline for future studies on how AI curriculum materials evolve in online marketplaces. As teachers increasingly source supplementary materials from online marketplaces like TpT (Archambault et al., 2021), a more detailed understanding of AI curriculum materials content is needed. Identifying common content patterns helps provide insight into what AI-related educational materials are being created and circulated. This is particularly relevant given the widespread attention surrounding tools like ChatGPT, yet limited knowledge about the specific instructional focus of AI curriculum materials. By analyzing curriculum material descriptions, this study contributes to a broader understanding of AI content development trends in teacher-driven marketplaces.

Understanding what makes AI curriculum materials popular can provide insight into teacher preferences when selecting educational materials. While prior research has explored AI's

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role in education, there is little empirical analysis of which characteristics of AI curriculum materials correspond with higher adoption rates. Popularity metrics such as download counts may reflect patterns in teacher demand, helping stakeholders identify which subjects, formats, or price points are associated with greater engagement. Analyzing trends among the most downloaded AI curriculum materials further clarifies how teachers are integrating AI into instruction and what kinds of materials they find most useful.

The overall purpose of this study, then, is to understand recent trends in AI curriculum materials. The following research questions guided our investigation:

RQ1: What are the characteristics of AI curriculum materials on the teacher marketplace TpT?

RQ2: What characterizes the most popular TPT AI curriculum materials?

Method

Data Collection

We employed web scraping to systematically extract publicly available data from TpT, following best practices outlined by Munzert et al. (2015) and Greenhalgh et al. (2020). While our institutions did not classify this method as *human subjects research*, ethical considerations remained central to our approach (Greenhalgh et al., 2020; Henderson et al., 2013). Following the guidelines of the SIGCHI Ethics Committee (2017), we ensured that no personally identifiable information was collected, and the research value justified the use of web scraping. Our dataset comprises 1,607,767 entries from TpT for the year 2023, from which we identified 2,254 AI-related curriculum materials based on keyword filtering. Keywords used were "*generative artificial intelligence*," "*generative AI*," "*artificial intelligence*," "*DALL-E*," and

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"ChatGPT." The data collection process followed methodologies previously applied in educational technology research (Shelton et al., 2021).

Data Cleaning and Processing

The data underwent a series of preprocessing steps to ensure analytical rigor. First, we removed duplicate entries and assigned each curriculum material a unique ID. We then selected key variables, including title, grade level, subject, resource type, file type, description, follower count, cost (discounted), and downloads. Multi-tag variables such as grade level, subject, resource type, and file type were expanded into separate binary indicators. Text preprocessing was applied to the description variable, including tokenization, stopword removal, punctuation filtering, and the elimination of special characters. Since the distribution of downloads was highly skewed, a logarithmic transformation was applied to normalize the data, making it more suitable for regression analysis.

Data Analysis

This study employed a mixed-methods approach, specifically an explanatory sequential design, to explore the research questions. An explanatory sequential mixed-methods design begins with quantitative analysis to identify general trends and relationships, followed by qualitative analysis to provide deeper understanding and explanatory insight into these initial findings (Creswell & Plano Clark, 2017). We selected this design because it allowed us to first statistically assess the characteristics and popularity of AI curriculum materials on TpT, then use qualitative methods to further interpret and contextualize these quantitative results.

For RQ1, we conducted a descriptive statistical analysis to explore the structure of AI curriculum materials on TpT. The frequency and distribution of AI curriculum materials were analyzed across key attributes, including grade level, resource type, and subject, with the top 15

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tags examined in each category. Additionally, the distribution of file types was analyzed by identifying the ten most common file formats and reporting their frequency, percentage distribution, average discounted price, total downloads, and mean downloads per curriculum material. Last, a bigram analysis was performed on the curriculum material description to identify the 10 most frequently occurring two-word phrases and their percentages.

For RQ2, we investigated the drivers of AI curriculum material popularity on TpT using regression model with log-transformed download counts as the outcome. All predictors were entered as categorical factors via dummy coding. Specifically, subject area, grade level, and resource type were each represented by indicator variables for their fifteen most frequent tags (e.g., Science; English Language Arts; Computer Science; 4th–8th grade; Homeschool; Higher Education; Activities; Worksheets; PowerPoint Presentations), while file type was similarly coded for the ten most common formats (e.g., PDF, Google Slide, JPEG). We also included ten binary bigram flags to capture the presence of high-frequency two-word phrases in resource descriptions, and treated discounted cost as a four-level nominal factor (Free, Low, Medium, High) to assess the impact of pricing on download patterns. To complement these quantitative findings, we conducted a qualitative case study of the top 20 most downloaded AI curriculum materials, analyzing their design and content characteristics concerning key features identified in RQ1. These curriculum materials were examined in terms of grade level, subject, resource type, and file type, providing deeper insights into the composition of the most popular AI curriculum material on TpT. Furthermore, one representative case from this set was selected for a more detailed analysis, offering illustrative examples of trends in AI curriculum materials design and use.

Results

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RQ1: What are the characteristics of AI curriculum materials on the teacher marketplace

TpT?

The characteristics of AI curriculum materials, summarized in Table 1, are detailed in the following sections according to their grade level, resource type, and subject area.

Grade Level

K-12 education collectively represents the most prominent portion of the curriculum materials, underscoring the widespread adoption of AI tools across different school levels, see Table 1. Within this category, the "9th - 12th" segment accounts for 26.13%, indicating a strong representation in high school education. Middle school levels, such as "6th-12th" (7.36%), "7th-12th" (6.48%), and "8th-12th" (3.95%) also demonstrate a targeted focus. The "Homeschool" category comprises 46.54% of the total curriculum materials, indicating substantial demand among homeschooling educators, potentially due to the flexibility and customization that AI tools can offer. "Higher Education" curriculum materials account for 32.79% of the total, signifying notable interest in AI tools at the college and university levels, while "Adult Education" constitutes 29.64%, highlighting a focus on continuing education and professional development. Curriculum materials targeted at "Staff" represent 22.58%, underscoring the importance of AI tools for teacher professional development and administrative purposes.

Resource Type

"Activities" is the most common resource type, comprising 40.51% of the total curriculum materials. "Worksheets" follow at 32.79%, indicating a strong presence of structured, ready-to-use materials. Additionally, "Printables" (20.32%) and "Lesson" (18.06%) materials are frequently uploaded, suggesting that many educators favor complete lesson plans and

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immediately accessible materials. Other types include "Outlines" (15.57%) and "Handouts" (9.09%), which serve as supplementary instructional aids. Furthermore, categories such as "Assessments" (7.45%) and "Professional Development" materials (5.86%) highlight the inclusion of evaluative tools and teacher training resources. Moderate usage is observed for "Independent Work Packets" (5.68%), "Movie Guides" (4.79%), and "PowerPoint Presentations" (4.48%), indicating a diversification in multimedia and teaching strategies. Less frequent categories, including "Research" (3.99%), "Homework" (3.55%), "For Principals & Administrators" (3.19%), and "Teacher Manuals" (3.11%), represent more specialized niches.

Subject Type

The most prevalent category is "Computer Science - Technology," accounting for 26.35% of the curriculum materials, indicating a strong focus on digital literacy and computational skills. Other significant categories include "English Language Arts" (20.76%) and "Social Studies - History" (14.69%) highlighting the integration of AI tools in language and social studies education. Subjects like "Science" (14.11%) and "Instructional Technology" (7.85%) show a notable presence, reflecting the adoption of AI in scientific education and teaching methodologies. Although specific subjects like "Critical Thinking," "Writing," and "U.S. History" each account for a smaller percentage (ranging from 5.77% to 6.52%), they collectively emphasize the diverse applications of AI in fostering analytical skills, literacy, and historical understanding.

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Table 1*Top 15 TpT AI Curriculum Materials Descriptive Statistics*

Grade	N	%	Resource	N	%	Subject	N	%
Homeschool	1049	46.54%	Activities	913	40.51%	Computer Science - Technology	594	26.35%
Higher Education	739	32.79%	Worksheets	739	32.79%	English Language Arts	468	20.76%
Adult Education	668	29.64%	Printables	458	20.32%	Social Studies - History	331	14.69%
9th - 12th	589	26.13%	Lesson	407	18.06%	Science	318	14.11%
Staff	509	22.58%	Outlines	351	15.57%	Instructional Technology	177	7.85%
Not Grade Specific	359	15.93%	Handouts	205	9.09%	Critical Thinking	147	6.52%
6th - 12th	166	7.36%	Assessment	168	7.45%	Writing	132	5.86%
7th - 12th	146	6.48%	Professional Development	132	5.86%	U.S. History	130	5.77%
8th - 12th	89	3.95%	Independent Work Packet	128	5.68%	Biology	124	5.50%
11th - 12th	63	2.80%	Movie Guides	108	4.79%	Reading	119	5.28%
10th - 12th	61	2.71%	PowerPoint Presentations	101	4.48%	World History	115	5.10%
4th - 8th	49	2.17%	Research	90	3.99%	For All Subjects	114	5.06%
7th - 10th	39	1.73%	Homework	80	3.55%	Career and Technical Education	110	4.88%
PreK-12th	37	1.64%	For Principals & Administrators	72	3.19%	For All Subject Areas	98	4.35%
5th - 12th	35	1.55%	Teacher Manuals	70	3.11%	Math	93	4.13%

Note. A single resource can be tagged as multiple resource tags among Grade level, Resource type, and Subject.

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AI Curriculum Material File Type with Downloads and Cost

PDFs are the most prevalent file type, comprising 44.37% of the curriculum materials, and they also have the highest total downloads (8,203) with an average of 8.2, this indicates that PDFs are the preferred format due to their ease of use and compatibility across devices, see Table 2. PPTX files, while only 2.57% of the curriculum materials, exhibit the highest average download rate of 20.28, indicating that PowerPoint presentations are highly valued and frequently used by educators. Zip files, which represent 31.77% of the curriculum materials, have a significant total of 2,995 downloads, averaging 4.18 downloads, reflecting their utility in bundling multiple resources together. The presence of Google services, such as Google Drive folders, Google Docs, Google Slides, and Google Forms, highlights the integration of cloud-based and collaborative tools in curriculum materials. Although these formats are less prevalent (ranging from 0.58% to 4.88%), their average costs are generally higher. Notably, Google Slides has a higher average cost (5.84) but lower total and average downloads, suggesting selective but valued use. Word Document Files and JPEG images show varying degrees of popularity, with Word Documents having a moderate average download rate (5.1) and JPEG images being less engaged overall.

The integration of multiple Google-related formats suggests a trend towards using cloud-based tools in curriculum materials, but their lower engagement levels indicate that these tools may not be as widely used as traditional formats like PDFs and PPTX files. The popularity of PDFs and PPTX files underscores the effectiveness and preference for these formats in delivering educational content, with PPTX files valued for their interactive and presentation capabilities.

Table 2

TPT AI Curriculum Material File Type with Average Cost and Downloads

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File type	Count	Percentage	Avg Cost	Total downloads	Avg downloads
PDF	1000	44.37%	5.09	8203	8.2
Zip	716	31.77%	6.19	2995	4.18
Google Drive	110	4.88%	3.53	0	0
Word Document	110	4.88%	3.18	561	5.1
Google Docs	59	2.62%	5.15	6	0.1
Google Slides	59	2.62%	5.84	17	0.29
PPTX	58	2.57%	3.73	1176	20.28
Jpeg	37	1.64%	0.54	83	2.24
Google Forms	17	0.75%	0.97	0	0
Google Slides	13	0.58%	6.44	3	0.23

Content Focus in TPT AI Curriculum Material Descriptions

The bigram analysis of TpT AI curriculum material descriptions reveals several prominent content features (see Table 3). The most frequent phrase, “artificial intelligence” ($n = 1575$, 69.88%), highlights the core theme of these materials. Other prevalent bigrams include “answer key” ($n = 607$, 26.93%), “computer science” ($n = 505$, 22.40%), and “crash course” ($n = 499$, 22.14%), reflecting an emphasis on structured learning support and concise instructional formats. The presence of terms like “intellectual property” ($n = 492$, 21.83%), “classroom use” ($n = 462$, 20.50%), and “critical thinking” ($n = 459$, 20.36%) underscores a clear focus on practical application, pedagogical integration, and skills development. Additionally, terms such as “digital information” ($n = 449$, 19.92%), “soft skills” ($n = 435$, 19.39%), and “media literacy” ($n = 421$, 19.12%) indicate the breadth of topics covered and the interdisciplinary nature of AI curriculum materials on TpT.

Table 3*Top 10 TPT AI Curriculum Material Description Bigrams*

Bigrams	Count	Percentage
Artificial Intelligence	1575	69.88%
Answer Key	607	26.93%

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Computer Science	505	22.40%
Crash Course	499	22.14%
Intellectual Property	492	21.83%
Classroom Use	462	20.50%
Critical Thinking	459	20.36%
Digital Information	449	19.92%
Soft Skills	435	19.39%
Media Literacy	421	19.12%

RQ2: What characterizes the most popular TPT AI curriculum materials?

The multiple regression analysis used download counts for TpT AI curriculum materials as the dependent variable (see Table 4). The final model was statistically significant ($F = 10.5$, $R^2 = 0.34$), indicating that approximately 34% of the variance in downloads can be explained by the included predictors. Among the subject areas, curriculum materials related to Computer Science ($\beta = 0.22$, $t = 2.39$, $p < 0.01$), Career and Technical Education ($\beta = 0.28$, $t = 2.59$, $p < 0.01$), and EFL/ESL/ELD ($\beta = 0.37$, $t = 2.80$, $p < 0.001$) were significantly associated with higher download counts. These results imply that materials in these domains are particularly valued, suggesting that educators might prioritize curriculum materials that align with key academic disciplines and language development requirements.

Specific grade levels demonstrated a positive relationship with downloads; curriculum materials targeting 11th–12th ($\beta = 0.37$, $t = 2.39$, $p < 0.05$), 3rd–8th ($\beta = 0.57$, $t = 2.53$, $p < 0.05$), and 5th–8th ($\beta = 0.60$, $t = 2.60$, $p < 0.01$) grades were more frequently downloaded. This association suggests that tailoring materials to distinct developmental stages may enhance their perceived relevance and utility among educators. Regarding resource types, formats such as PowerPoint Presentations ($\beta = 0.53$, $t = 4.91$, $p < 0.001$), Worksheets ($\beta = 0.31$, $t = 4.28$, $p < 0.001$), Research materials ($\beta = 0.41$, $t = 3.37$, $p < 0.001$), and Thematic Unit Plans ($\beta = 0.34$, $t = 2.05$, $p < 0.05$) significantly predicted higher downloads. This finding reflects a clear preference

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for curriculum material formats that are perceived as effective and user-friendly, thereby facilitating their integration into classroom instruction.

Cost emerged as a critical determinant of curriculum material popularity. We categorized cost_discounted into four levels— “Free” (0), “Low” (≤ 1), “Medium” (≤ 5), and “High” (> 5)—and used “Free” as the reference. Relative to free materials, those in the Low ($\beta = -1.73$, $t = -11.45$, $p < .001$), Medium ($\beta = -1.72$, $t = -16.61$, $p < .001$), and High ($\beta = -1.82$, $t = -15.72$, $p < .001$) cost categories all had significantly lower download counts. This inverse relationship suggests that even modest pricing may serve as a barrier to adoption, thereby emphasizing the critical role of affordability in the widespread utilization of AI curriculum materials on the TpT platform.

From the regression analysis, we identified significant predictors of downloads such as file type (with PDFs leading), subject areas (Computer Science - Technology, Career and Technical Education, and EFL/ESL/ELD), specific grade levels (11th–12th, 3rd–8th, and 5th–8th), resource types (including PowerPoint Presentations, Worksheets, Research, and Thematic Unit Plans), and cost (with low, medium, and high prices negatively affecting downloads compared to free curriculum materials).

Table 4

Regression Results for Predictors of TPT AI Curriculum Materials Downloads

Dependent Variable: Downloads	β	t
Intercept	2.62	3.2
Subject (Computer Science, Technology)	0.22**	2.39
Subject (Career and Technical Education)	0.28**	2.59
Subject (EFL; ESL; ELD)	0.37***	2.8
Grade Level (11th...12th)	0.37*	2.39
Grade Level (3rd...8th)	0.57*	2.53
Grade Level (5th...8th)	0.60**	2.60
Resource Type (PowerPoint, Presentations)	0.53***	4.91

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Resource Type (Worksheets)	0.31***	4.28
Resource Type (Research)	0.41***	3.37
Resource Type (Thematic, Unit Plans)	0.34*	2.05
Cost (Low)	-1.73***	-11.45
Cost (Medium)	-1.72***	-16.61
Cost (High)	-1.82***	-15.72
<i>F</i>		10.5
<i>R</i> ²		0.34

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

EFL = English as a Foreign Language; ESL = English as a Second Language; ELD = English Language Development.

Selection Criteria for the Top 20 Free TPT AI Curriculum Materials

Following from the findings from the regression analysis which identified significant predictors of downloads, we developed a procedure for selecting the most downloaded, free materials. Specifically, we first ranked all AI curriculum materials by their download counts to identify those with the highest levels of engagement, initially focusing on the top 100 entries. To ensure robustness, we applied a minimum download threshold (downloads > 90) and excluded entries with unreliable metadata—specifically, those containing promotional content or advertisements that redirect users to external shopping platforms, as well as curriculum materials that mention AI but do not pertain to AI-related educational content. Recognizing that curriculum material tags on TpT are manually added by content providers, we then conducted a manual review of the shortlisted entries to verify the accuracy of their subject, grade level, and resource type labels. This step ensured that only curriculum materials with reliable and consistent metadata were retained. Finally, we refined the ranking to obtain a final sample of the top 20 free curriculum materials that captured a broad range of subject areas, grade levels, and resource types. Given that our regression analysis indicated that cost significantly influences download counts, our focus on free curriculum materials inherently controls pricing effects. Table A.1 in Appendix A presents the final sample.

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From the 20 aforementioned materials, we selected one (titled "Artificial Intelligence - AI - Reading Comprehension Worksheets") on the basis of its contrasting yet complementary attributes relative to the other 19. Specifically, this material was chosen because it exhibits the highest cumulative download count ($n = 2,378$), with its PDF format—recognized as the most dominant file type on TpT—reinforcing its wide accessibility and appeal. Moreover, the curriculum aligns strongly with the significant predictors identified in our regression analysis; it is categorized under the subject area of Computer Science – Technology is targeted at grades 7–12 and is formatted as a worksheet—factors that were statistically associated with higher downloads. Additionally, dynamic tracking revealed that the download count increased from 817 in February 2024 to 2,378 by February 2025, corresponding to an average of 4.27 downloads per day. This robust performance substantiates its status as the most highly engaged curriculum material among the top 20 free AI curriculum materials.

Case Analysis of the Most Downloaded AI Curriculum Material

The curriculum material is titled "Artificial Intelligence - AI - Reading Comprehension Worksheets" and centers on the provocative question, "Will Artificial Intelligence Take Over?" It outlines clear objectives:

- To identify the three main types of Artificial Intelligence,
- To compare and contrast Narrow AI and Real AI,
- To explain the diverse ways Narrow AI learns and functions, and
- To identify the possible pros and cons of Narrow AI.

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This content design facilitates a foundational understanding of AI concepts and promotes critical thinking, an approach that resonates with the pedagogical preferences revealed in our quantitative analysis.

Delivered in PDF format, this curriculum material comprises 8 printable pages and includes an answer key that is readily accessible to teachers. Its clean, well-organized layout enhances usability, while the structured presentation of learning objectives and corresponding questions enables educators to seamlessly incorporate the material as either a primary lesson or a supplemental activity. Notably, three of the pages are dedicated to concise content segments that address key aspects of AI: defining what AI is, exploring what AI can do, and examining the impact of AI. The assessment design predominantly features multiple-choice questions aimed at evaluating comprehension, supplemented by True/False items that foster students' initial critical thinking regarding AI-related information, details see Figure 1. Overall, the content is highly structured and succinct, reflecting the emerging "crash course" trend identified in our topic modeling analysis of AI curriculum material descriptions.

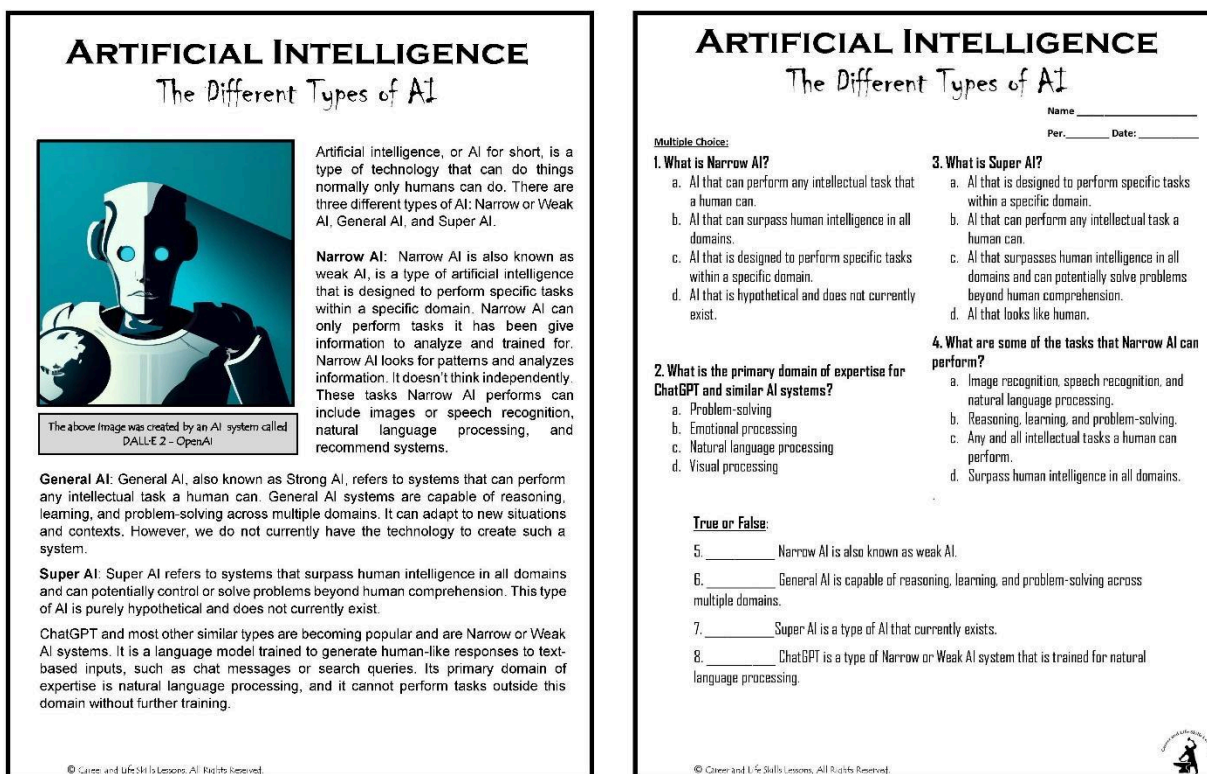
User feedback further substantiates the practical value of this material. One reviewer commented, *"This was a good curriculum material to use when I needed a 'filler.' Not too short, not too long. We had a good discussion about the topic,* highlighting its balanced length and capacity to facilitate classroom discussions. Another educator described it as *"an engaging AI curriculum material—perfect for building comprehension and introducing tech concepts. Highly recommend!"*, underscoring its effectiveness in conveying complex AI ideas in an accessible manner. In addition, a teacher noted that the lesson was *"a great, easy-to-understand intro for middle or high school students"* with clear objectives that effectively differentiated between types of AI and the distinctions between Narrow and Real AI. This educator also mentioned that the curriculum material worked well as a substitute plan in a coding class, providing sufficient

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structure for independent student work and sustained engagement. Furthermore, another reviewer emphasized that their students were actively engaged in the activity, which sparked insightful discussions about the role and use of AI and stated that they would use the product again. While a few minor concerns were raised regarding the alignment of the answer key with the reading materials, these issues did not detract from the overall positive reception and high practical value of the curriculum material.

Figure 1

Most Downloaded Free AI Curriculum Material Content Design



Discussion

In this section, we summarize the key findings organized by research question and discuss their significance. We adopted an explanatory sequential mixed methods design

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(Creswell & Plano Clark, 2017), first employing quantitative analyses to broadly characterize the AI curriculum marketplace on TpT and identify predictors of material popularity. Then, we conducted qualitative case studies to explore these quantitative findings in greater detail. This mixed-methods approach allowed us to comprehensively describe key trends and subsequently examine specific examples, enriching our understanding of how educators select and utilize popular AI curriculum materials.

For RQ#1, regarding the characteristics of AI curriculum materials on TpT, our analysis reveals that curriculum materials focused on Computer Science – Technology and English Language Arts are predominant, suggesting these disciplines are at the forefront of integrating AI concepts into the curriculum. Activities and worksheets are the most frequent resource types, indicating that educators prefer interactive and easily accessible materials that can be quickly integrated into their teaching practices. Although K–12 curriculum materials constitute the majority of the offerings, it is noteworthy that 46.54% of the AI curriculum materials are specifically designed for homeschool educators, reflecting a growing demand for AI tools in non-traditional educational environments. Our content-pattern analysis reveals a dual trend: AI curriculum materials are simultaneously catering to teachers’ demand for low-prep, “crash course” style modules and integrating higher-order competencies, such as critical thinking, media literacy, and digital ethics. This suggests that future AI curriculum design should strike a balance between plug-and-play accessibility and opportunities for deeper exploration, enabling educators to deploy concise introductory lessons quickly while offering modular extension activities that guide students toward more in-depth inquiry and practice.

These findings are significant for several reasons. First, they extend the existing research base: previous work (Allman et al., 2024) provided only a high-level trend analysis of AI mentions on the TpT platform—tracking aggregate counts and year-to-year growth—but did not

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probe the internal structure of those resources. In contrast, our analysis of 2,254 AI-related materials uses systematic tag separation and descriptive statistics to map exactly how these curriculum resources are distributed across subjects, formats, and grade bands, offering the granular content profile that prior work lacked. In particular, we find that computer science and language-learning materials lead in AI adoption on the platform. Understanding these distribution patterns is critical for informing the development and adoption strategies of future AI curriculum materials and for guiding broader discussions on AI's role in shaping contemporary learning environments.

For RQ #2, the regression model ($F = 10.5$, $R^2 = 0.34$) underscored that AI remains centered in technical and language-learning domains. Materials tagged for EFL/ESL/ELD showed the strongest positive association with downloads ($\beta = 0.37$, $p < 0.001$), with Career & Technical Education ($\beta = 0.28$, $p < 0.01$) and Computer Science – Technology ($\beta = 0.22$, $p < 0.01$) also predicting higher uptake. By contrast, most other K–12 disciplines saw limited engagement. We further found that grade level—particularly high-school—and resource type (notably worksheets) significantly boost download counts. Cost emerged as a major barrier: higher-priced AI materials experienced markedly fewer downloads, prompting our focus on the 20 most free curriculum materials for qualitative follow-up.

The selected AI curriculum material is the convergence of quantitative trends and practical efficacy observed in our study. The curriculum material's concise, “crash course” design—featuring clearly defined AI concepts, structured objectives, and assessment items that promote critical thinking—underscores its accessibility and pedagogical value. Dynamic tracking and positive teacher feedback further attest to its sustained engagement and practical utility, validating its representativeness within the broader landscape of TpT AI curriculum materials. The worksheet's runaway popularity—2,378 downloads by February 2025—suggests it fills a

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clear need for K–12 teachers: a ready-to-use, low-prep introduction to AI that fits neatly into one class period. Delivered as an 8-page PDF, “Artificial Intelligence – AI – Reading Comprehension Worksheets” centers on the provocative question “Will Artificial Intelligence Take Over?” and scaffolds learning through four targeted objectives (types of AI; Narrow vs. Real AI; AI learning mechanisms; pros and cons), a mix of multiple-choice and True/False items, and a built-in answer key. Teachers praised its “perfect for a filler” length, “engaging intro for middle/high school,” and seamless plug-and-play design, highlighting how guided questions reduce planning time and spark discussion.

The significance of these findings lies in their contribution to a deeper understanding of the factors that drive educators’ preferences for AI curriculum materials. By identifying key predictors—such as subject relevance, grade level, resource type, and cost—this study equips educators with the insights necessary to make informed decisions regarding the selection and implementation of AI materials. Furthermore, the detailed case analysis provides practical insights into effective content design and pedagogical strategies, thereby offering valuable guidance for AI curriculum material developers and platform managers seeking to align their offerings with educators’ needs.

Limitations

While this study offers valuable insights into AI curriculum materials on TpT, several limitations should be noted. First, our analysis is confined to data from the TpT and focuses exclusively on a complete natural year (2023). Although this dataset serves as a starting point, it may not capture the full spectrum of AI curriculum materials available on other platforms. Future research should incorporate data from multiple platforms to achieve a more comprehensive understanding of the AI curriculum materials landscape. Second, our study primarily relied on content analysis of curriculum materials descriptions, which may not fully

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reflect the practical application of these curriculum materials in classroom settings. To better assess their actual impact on learning outcomes, subsequent research should integrate data from classroom implementations and user interactions. Third, while the regression model identified significant predictors of downloads, it may not account for all possible factors influencing curriculum materials popularity. Variables such as marketing strategies and the degree of alignment with specific curriculum standards may also play critical roles. Future studies should explore additional variables to enhance the model's predictive power and provide a more nuanced understanding of educators' AI curriculum materials selection behaviors.

Implications for Practice

This research has several practical implications for practice—in particular, for educators, and for the designers of materials (curriculum material developers and platform managers). For educators, the results underscore the importance of selecting curriculum materials that offer interactive, hands-on learning opportunities. Our analysis indicates that materials such as activities and "crash courses"—characterized by their concise structure and clearly defined learning objectives—can significantly enhance student engagement and comprehension. The detailed case analysis of the "Artificial Intelligence – AI Reading Comprehension Worksheets" further reinforces this point by demonstrating how a well-structured curriculum material, which combines interactive assessments and critical thinking prompts, can effectively foster classroom discussions. Educators are therefore encouraged to prioritize curriculum materials that are both pedagogically sound and tailored to the specific needs of their students, particularly in high-impact subject areas like Computer Science – Technology and language learning.

For curriculum material developers, affordability emerges as a critical determinant of curriculum materials uptake. Our quantitative findings clearly indicate that free and low-cost curriculum materials garner significantly higher download counts. The case analysis also

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highlights the value of interdisciplinary and adaptable content—such as the integration of AI concepts into reading comprehension activities—which aligns with educators’ demand for practical, easy-to-implement tools. Developers should therefore consider offering accessible pricing models and designing curriculum materials that are concise, user-friendly, and adaptable across various educational levels and contexts.

For platform managers, the increasing demand for AI curriculum materials underscores the need for robust curation. The positive feedback and high engagement observed in the case analysis suggest that when curriculum materials meet rigorous pedagogical objectives and align with key predictors—such as subject relevance, appropriate grade-level targeting, and effective resource types—they are more likely to be widely adopted. Platform managers can leverage these insights by implementing systematic curation strategies (e.g., peer review systems, integration of user feedback, and regular updates) to ensure that only curriculum materials with demonstrated educational value are prominently featured.

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Declaration of competing interests

The authors report there are no competing interests to declare.

Authorship contribution statement

Wei Wang: Data curation, Formal analysis, Methodology, Software, Writing – original draft.

Joshua M. Rosenberg: Conceptualization, Resources, Writing – review & editing.

Matthew J. Koehler: Validation, Writing – review & editing.

Ethics declarations

The research did not involve human participants.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or non-profit sectors.

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Appendix A

Table A.1

Top 20 Free TPT AI Curriculum Materials.

Title	Downloads	Resource	Grade	Subject	File
Artificial Intelligence - AI - Reading Comprehension Worksheets	2368	Worksheets, Handouts	7th - 12th,	Computer Science - Technology, Reading	PDF
AI DEBATE FREE Artificial Intelligence Critical Thinking Activity	771	Activities, Graphic Organizers	9th - 12th	English Language Arts, Critical Thinking, Oral Communication	PDF
What is Artificial Intelligence? (AI) - Lesson and Exploration	590	Assessment, Printables	5th - 10th	Computer Science - Technology	Zip
"Artificial Intelligence" - AP Spanish Language lesson plan!	426	PowerPoint Presentations, Activities, Lesson	9th - 12th	Science, Spanish, Informational Text	Zip
Exploring Artificial Intelligence (AI)	406	Worksheets, Printables	5th - 10th	English Language Arts, Reading	PDF
"Unethical Uses of A.I." Printable	397	Printables	8th - 12th	English Language Arts, Computer Science - Technology, Critical Thinking	PDF
Artificial Intelligence Reading Passage	393	Activities, Printables	6th - 8th	Computer Science - Technology, Robotics, Informational Text	PDF
PD Resources: The Ultimate Year-Long Guide to Professional Development	277	Activities, Professional Development	Not Grade Specific	Professional Development, For Administrators, Coaching	PDF
FREE Intro to ChatGPT for Language Arts Analysis 	275	Worksheets, Lesson	7th - 12th, Homeschool	English Language Arts, Computer Science - Technology, Writing	PDF

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Strengths & Weaknesses

Artificial Intelligence Ethical Use Guidelines	258	Handouts	Not Grade Specific	Computer Science - Technology	PDF
ChatGPT End-of-Year Extravaganza for Educators	242	Activities, Printables	Not Grade Specific	End of Year	PDF
Introduction to Ethical use of Artificial Intelligence in the Classroom	200	Lesson	7th - 10th	Creative Writing, Science, Social Studies - History	PDF
Fake News with AI	191	Lesson	3rd - 7th	English Language Arts, Computer Science - Technology, Library Skills	Word
Understanding Fake News (with AI)	150	PowerPoint Presentations	3rd - 7th	Library Skills	Word
ChatGPT and AI Classroom Rules Presentation Template Free for Canva Pro. ESL/ELA	128	PowerPoint Presentations, Activities, Professional Development	Not Grade Specific	English Language Arts, Computer Science - Technology, EFL - ESL - ELD	PDF
ChatGpt Prompts for High School Teachers Classroom Management Back to School	127	Teacher Manuals, Classroom Forms, Professional Development	7th - 12th	Career and Technical Education, Classroom Management, Back to School	PDF
FREEBIE - Artificial Intelligence: Discussion Prompts	104	Thematic Unit Plans, Activities, Lesson	10th - 12th, Adult Education	Computer Science - Technology, EFL - ESL - ELD, Other (ELA)	PPTX
Teachers Learn to Use Artificial Intelligence, AI, in Classroom	92	Thematic Unit Plans, Activities, Lesson	Not Grade Specific	English Language Arts, For All Subject Areas, Character Education	PDF
Computational Thinking Unlocking the Power of Problem Solving	92	Projects, Service Learning	Not Grade Specific	Computer Science - Technology, Life Skills, Problem Solving	PDF
Homophone Flash Cards - Chat GpT Practice (Grade 3, Grade 4, Grade 5, Grade 6)	91	Activities, Flash Cards	3rd - 6th	English Language Arts	PDF

TRENDS IN AI CURRICULUM MATERIALS

Table 1*Top 15 TpT AI Curriculum Materials Descriptive Statistics*

Grade	N	%	Resource	N	%	Subject	N	%
Homeschool	1049	46.54%	Activities	913	40.51%	Computer Science - Technology	594	26.35%
Higher Education	739	32.79%	Worksheets	739	32.79%	English Language Arts	468	20.76%
Adult Education	668	29.64%	Printables	458	20.32%	Social Studies - History	331	14.69%
9th - 12th	589	26.13%	Lesson	407	18.06%	Science	318	14.11%
Staff	509	22.58%	Outlines	351	15.57%	Instructional Technology	177	7.85%
Not Grade Specific	359	15.93%	Handouts	205	9.09%	Critical Thinking	147	6.52%
6th - 12th	166	7.36%	Assessment	168	7.45%	Writing	132	5.86%
7th - 12th	146	6.48%	Professional Development	132	5.86%	U.S. History	130	5.77%
8th - 12th	89	3.95%	Independent Work Packet	128	5.68%	Biology	124	5.50%
11th - 12th	63	2.80%	Movie Guides	108	4.79%	Reading	119	5.28%
10th - 12th	61	2.71%	PowerPoint Presentations	101	4.48%	World History	115	5.10%
4th - 8th	49	2.17%	Research	90	3.99%	For All Subjects	114	5.06%
7th - 10th	39	1.73%	Homework	80	3.55%	Career and Technical Education	110	4.88%
PreK-12th	37	1.64%	For Principals & Administrators	72	3.19%	For All Subject Areas	98	4.35%
5th - 12th	35	1.55%	Teacher Manuals	70	3.11%	Math	93	4.13%

Note. A single resource can be tagged as multiple resource tags among Grade level, Resource type, and Subject.

TRENDS IN AI CURRICULUM MATERIALS

Table 2*TPT AI Curriculum Material File Type with Average Cost and Downloads*

File type	Count	Percentage	Avg Cost	Total downloads	Avg downloads
PDF	1000	44.37%	5.09	8203	8.2
Zip	716	31.77%	6.19	2995	4.18
Google Drive	110	4.88%	3.53	0	0
Word Document	110	4.88%	3.18	561	5.1
Google Docs	59	2.62%	5.15	6	0.1
Google Slides	59	2.62%	5.84	17	0.29
PPTX	58	2.57%	3.73	1176	20.28
Jpeg	37	1.64%	0.54	83	2.24
Google Forms	17	0.75%	0.97	0	0
Google Slides	13	0.58%	6.44	3	0.23

TRENDS IN AI CURRICULUM MATERIALS

Table 3*Top 10 TPT AI Curriculum Material Description Bigrams*

Bigrams	Count	Percentage
Artificial Intelligence	1575	69.88%
Answer Key	607	26.93%
Computer Science	505	22.40%
Carsh Course	499	22.14%
Intellectual Property	492	21.83%
Classroom Use	462	20.50%
Critical Thinking	459	20.36%
Digital Information	449	19.92%
Soft Skills	435	19.39%
Media Literacy	421	19.12%

TRENDS IN AI CURRICULUM MATERIALS

Table 4

Regression Results for Predictors of TPT AI Curriculum Materials Downloads

Dependent Variable: Downloads	β	t
Intercept	2.62	3.2
Subject (Computer Science, Technology)	0.22**	2.39
Subject (Career and Technical Education)	0.28**	2.59
Subject (EFL; ESL; ELD)	0.37***	2.8
Grade Level (11th...12th)	0.37*	2.39
Grade Level (3rd...8th)	0.57*	2.53
Grade Level (5th...8th)	0.60**	2.60
Resource Type (PowerPoint, Presentations)	0.53***	4.91
Resource Type (Worksheets)	0.31***	4.28
Resource Type (Research)	0.41***	3.37
Resource Type (Thematic, Unit Plans)	0.34*	2.05
Cost (Low)	-1.73***	-11.45
Cost (Medium)	-1.72***	-16.61
Cost (High)	-1.82***	-15.72
F		10.5
R^2		0.34

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

EFL = English as a Foreign Language; ESL = English as a Second Language; ELD = English Language Development.