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Commerce Verse: An AI-Powered Virtual Commerce Laboratory Integrating Tally Prime and GST Filing for Experiential Learning under Skill 5.0 and Viksit Bharat @2047

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Abstract:

Commerce education in India is at a crucial point: the curriculum still focuses on manual ledgers and theoretical taxation whereas the working world has already adopted cloud-based accounting software, real-time GST compliance, AI-based decision making. Commerce Verse is conceptualized in this paper as an artificial intelligence (AI) enabled virtual commerce laboratory that combines tally prime for bookkeeping and inventory management with a simulated GST filing module, all wrapped together in an adaptive AI tutoring layer. The proposed system enables students to work with mock enterprises, enter actual transactions, create valid GST invoices and record Input Tax Credits (ITC) against these entries as well as file simulated GSTR-1/3B returns while receiving feedback on their responses in real-time. It places this proposal in India's skill 5.0 context of AI-enhanced, adaptive and industry aligned skilling, and long-term national vision for Viksit Bharat @2047 that requires a digitally literate, compliance ready & employable workforce in commerce. This research utilizes a design-based approach. The paper describes the system architecture, pedagogy strategy, implementation plan and expected learning outcomes of Commerce Verse, in addition to discussing the feasibility, challenges and policy alignment of implementing such labs within higher education institutions.

Keywords: *Virtual Commerce Lab; Tally Prime; GST Filing; Artificial Intelligence in Commerce Education; Experiential Learning in Commerce*

1. Introduction:

Historically, commerce and accounting education has been based upon textbook learning, manual journal entry exercises, and static case study examples that are outdated by several years relative to current regulatory and technological practices. The implementation of the goods and services tax regime in India brought about a drastic change to how businesses account, record, report and reconcile transactions while enterprise resource planning (ERP) and accounting software such as

tally prime became de facto standards in the industry. As a result of this, employers are increasingly demanding from commerce graduates proficiency not only in the theory of double entry bookkeeping but also in recording transactions on software-based systems, compliance with tax laws using digital means and financial analysis based on data from day one. National Skilling Policy in India has moved towards what may be termed as "Skill 5.0", a paradigm which integrates Artificial Intelligence, adaptive learning technologies and human centered design to create personalized vocationally and professionally focused training that is scalable and continuously updated based upon an ever-changing job market. This vision has similarities to the long-term national plan of Viksit Bharat @2047. The plan foresees India as a developed economy by its one hundredth anniversary of independence, supported by digitally literate and globally competitive workforce which is also tax compliant. As a major feeder of India's accounting, taxation and financial services workforce commerce education has a role to play in realizing this vision. This paper describes a virtual commerce laboratory called CommerceVerse, designed to bridge the gap between theoretical education and industry level practice. CommerceVerse is a single, experiential learning environment that integrates simulated business operations, tally prime-based bookkeeping, GST filing sandbox and AI tutoring/analytics. The balance of this paper will present relevant literature, outline the research gap, explain the architecture and methodology proposed for our system, and relate it to skill 5.0 and viksit bharat @2047 prior to concluding with a path forward (implementation roadmap) along with discussions on feasibility and limitations.

The literature on AI in education is still evolving and emphasizes the following mechanisms for tailoring content and pace to learners: adaptive learning systems, intelligent tutoring, automated error detection and dashboards of learning analytics. This same trajectory is encapsulated under "skill 5.0" in the broader Indian policy context, encompassing prior phases of skilling reform (Skill India and subsequent digital & industry 4.0 aligned iterations), that conceptualizes AI not as an instructor replacement but rather as an augmentation layer providing immediate formative feedback on a scale far exceeding individual instructors.

3. Objectives of the Study:

- To conceptualise an integrated virtual commerce laboratory, combines simulated enterprise operations, Tally Prime-based bookkeeping, and GST filing practice.
- To design an AI tutoring and analytics layer that provides real-time, adaptive feedback to learners and progress visibility to instructors.
- To map the proposed system's pedagogical design to the objectives of Skill 5.0 and the national vision of Viksit Bharat @2047.
- To outline a feasible implementation roadmap, along with anticipated challenges and limitations, for higher education institutions.

4. Proposed System: Commerce Verse Architecture:

Commerce Verse is conceived as a four-layer system:

- (I) Simulation layer - It generates realistic business scenarios and source documents;
- (II) Operations layer - Built around Tally Prime for transaction recording, inventory, and payroll;
- (III) Compliance layer - Mirrors GST return filing (GSTR-1, GSTR-3B, e-invoicing, and ITC reconciliation) in a sandboxed, non-statutory environment;
- (IV) AI layer - Observes learner activity across the other three layers to detect errors, generate adaptive practice material, and produce analytics for instructors.

4.1 Simulation Layer:

Each student is assigned a virtual firm (retail, manufacturing or services) with an initial balance sheet, customer and vendor list, and list of events for transactions such as sales, purchases, expenses, payroll etc. The degree of difficulty in a trading scenario and the complexity involved in executing transactions may increase throughout an entire semester starting with single entity trading accounts and culminating with multi-branch/multi-GSTIN transactions.

4.2 Operations Layer: Tally Prime Integration:

Tally prime records transactions created by the simulation layer, learners utilize identical voucher types, ledgers and inventory master files as used in industry. This way the skill that is learned can be used on its own without being limited to a specific teaching tool.

4.3 Compliance Layer: GST Filing Sandbox:

Transactions recorded in tally prime feed into a GST filing sandbox that mirrors the structure of the GST portal, enabling learners to practice generating outward supply statements (gstr-1), reconciling GSTR-2B/ITC, and filing mock summary returns (gSTR-3B) along with e-invoice and e-way bill generation exercises entirely within a safe ungraded compliance environment.

4.4 AI Layer:

Three primary functions are performed by AI layer: error detection identifies mismatched ledger heads, incorrect tax rates or reconciliation gaps between accounts, adaptive scenario generation increases or decreases complexity of transactions based upon learner performance, analytics provides instructors with dashboards showing class-wide and individual progress metrics as well as time-on-task metrics along with common error patterns encountered by students.

5. Methodology:

Design-based research (DBR) methodology was selected due to its suitability for refining educational topics through iterative cycles of design, implementation and evaluation within authentic classroom environments. The methodology for developing and validating commerceVerse has been outlined as four stages.

5.1 Phase I: Needs Analysis:

Conducting structured surveys and facilitating peer group discussions among commerce professors, undergraduate students, and recruiting employers to identify the specific academic and skill gaps between current curriculum and industry expectations in bookkeeping, GST compliance, digital literacy.

5.2 Phase II: Prototype Development:

Creation of a minimal possible version of Commerce Verse, which represents one business scenario (a single entity trading firm), core tally prime transaction types and a basic GSTR-1/3B simulation along with a rule-based error-detection module as a parent to the full AI layer.

5.3 Phase III: Pilot Implementation:

A group of UG commerce students were given the prototype for an academic semester. The transaction accuracy, GST filing accuracy and task completion time are assessed by pre-test/post-test assessment with a sample size that is sufficient to be representative. Qualitative feedback regarding learner engagement and confidence are also gathered.

5.4 Phase IV: Evaluation and Iteration:

Analysis of the pilot data in comparison to the objectives outlined in Section 3, refinement of the AI layer's feedback and scenario library, and expansion to other types of businesses (manufacturing, services, multi-branched operations) prior to full-scale implementation.

6. Alignment with Skill 5.0 and Viksit Bharat @2047:

6.1 Skill 5.0:

Skill 5.0 signifies a progression of India's skill policy toward AI, enhanced adaptive and continuous vocational training aligned with immediate industry needs. This is what CommerceVerse does to operationalize the vision: it uses AI not just for content delivery but as a continuous feedback and adaptation tool; all learning is based on real software used in industry (Tally prime) and statutory processes (GST), rather than simplified abstractions; rich learning analytics are generated so that institutions can show measurable skill outcomes, rather than seat-time or credit hours completed.

6.2 Viksit Bharat @2047:

The Viksit Bharat @2047 vision is based upon several pillars relevant to commerce education including a formally established and tax compliant economy, a digitally competent workforce, and globally competitive human capital. The direct impact of a commerce workforce that is competent in digital bookkeeping and GST compliance from the day it graduates, is that it enables formalization of economic activity. It decreases the burden on India's large number of micro-small, medium enterprises (MSMEs) in terms of complying with laws by providing them with workers who can do accounting work for them. This directly improves India's competitive position in areas identified as growth areas for a developed economy: accounting services, tax consulting services, financial shared service providers and so on.

7. Expected Learning Outcomes:

Domain	Traditional Instruction	CommerceVerse
Bookkeeping	Manual journal/ledger exercises	Live Tally Prime transaction recording
Tax Compliance	Theoretical GST notes	Simulated GSTR-1/3B filing and ITC reconciliation
Feedback	Periodic instructor grading	Real-time AI-driven error detection
Difficulty Progression	Fixed syllabus pace	Adaptive, performance-based scenario complexity
Employability Signal	Grades/marksheet	Software proficiency + compliance portfolio

By completing the commerce Verse program, students will have demonstrate functional proficiency in tally prime across modules including sales, purchase, payroll, and inventory; accurate preparation and reconciliation of GST return in simulated environment; improved error recognition and self-correction ability evidenced by decreasing AI flagged error rates over semester; greater self-reported readiness for internships and entry level accounting or tax compliance roles.

8. Implementation Roadmap:

- Months 1-3: Needs analysis, stakeholder consultation, and curriculum mapping against existing commerce syllabi.
- Months 4-8: Prototype build covering one business scenario, core Tally Prime workflows, and a basic GST sandbox with rule-based feedback.
- Months 9-12: Pilot deployment in a single institution/cohort, with pre/post assessment and qualitative evaluation.
- Months 13-18: AI layer enhancement (adaptive difficulty, natural-language error explanations), expansion to manufacturing and services scenarios.
- Months 19-24: Multi-institution rollout, instructor training programme, and integration with institutional learning management systems.

9. Challenges and Limitations:

- Licensing costs and access to genuine Tally Prime software at institutional scale.
- Keeping the GST filing sandbox synchronised with frequent statutory changes to return formats

and tax rates.

- Faculty development programme, since instructors themselves may require training to supervise an AI-augmented laboratory effectively.
- Data privacy and responsible use of learner performance data collected by the AI analytics layer.
- Ensuring the simulation remains pedagogically sequenced rather than overwhelming novice users with industry-level complexity too early.

10. Conclusion:

Commerce Verse offers a conceptual model for addressing the persistent gap between commerce curriculum and the digital, compliance-driven realities of Indian business practice. By integrating simulated enterprise operations, Tally Prime-based bookkeeping, GST filing practice, and an AI-driven feedback and analytics layer, the proposed laboratory operationalises the aspirations of Skill 5.0 for adaptive, industry-aligned skilling, while contributing directly to the human-capital foundations required for Viksit Bharat @2047. Future work can focus on empirical piloting of the prototype described in this paper, rigorous evaluation of learning gains, and refinement of the AI layer's pedagogical logic ahead of wider institutional adoption.

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