Business Impact Analysis

**TASK 1**

Critical key business functions in the Digital Education (Eastern Cape)

The key business functions support the educational continuity, student success, administrative efficiency, and compliance.

KEY FUNCTIONS:

1. **LEARNING MANAGEMENT SYSTEM OPERATIONS (LMS)**

The LMS is known as a central to digital education delivery. It serves as the platform where learners and educators interact.

**Examples of LMS:** They include Moodle, Google, and MS Teams for Education.

**Core Functions:**

* Delivery of digital course material in a form of pdfs, videos, and PowerPoints.
* Online assessments and auto-marking tools.
* Assignment submissions.
* Student progress tracking and analysis.

**Impact of Disruption**

* Students unable to submit their work or accessing course materials.
* Educators unable to provide student feedback or grades.
* Difficulty in handling online teaching.

1. **Student Information Systems**

SIS are important for the administration of learner data as well as academic records.

**Functions include:**

* Student registration and enrolment. .
* Maintenance of personal and academic records.
* Exam and Assignment grade management.

**Examples:** Provincial SIS platforms

**Impact of Disruption**

* Students unable to register for exams
* Inability to process marks
* Disruption in learner progression.

**3** **Communication and Collaboration Platforms**

Communication tools are vital for teaching, administration, and real-time learner engagement.

**Examples include:**

MS Teams, Zoom, WhatsApp groups, Email platforms

**Key Functions:**

* Virtual classrooms and video conferencing
* One-on-one support or tutoring
* Broadcast announcements to students and staff
* Coordination between departments

**Impact of Disruption:**

* Educators unable to conduct live sessions
* Isolation of students, especially in rural areas with limited in-person access
* Delays in administrative and academic decisions

**4 Digital Content Repositories**

**Examples include:**

* Provincial digital libraries
* Government-supplied Open Educational Resources (OERs)

**Core Functions:**

* Access to e-books, journals, and research materials
* Downloadable course modules and training videos
* Shared drives for curriculum content and educator resources

**Impact of Disruption:**

* Students cannot access study materials
* Delay in self-paced learning and research
* Inability to meet academic deadlines

**5 Assessment and Examination Systems**

Online or hybrid assessment systems are increasingly critical, especially in post-pandemic education.

**Functions include:**

* Test scheduling and deployment
* Exam proctoring via webcam or browser lockdown
* Auto-grading for MCQs and feedback tools

Examples: Exam.net, Moodle Quiz Module, or DBE-administered platforms

**Impact of Disruption:**

* Exam cancellations or delays
* Loss of exam data, leading to disputes or remark requests
* Institutional credibility challenges

**6 Technical Support and Helpdesk Operations**

Support functions ensure users can resolve issues quickly and resume participation in educational activities.

**Functions include:**

* Troubleshooting login/access problems
* System updates and maintenance
* User guidance and FAQ support

**Impact of Disruption:**

* Users stuck with technical barriers with no assistance
* Escalation of minor issues into service-wide problems
* Increased downtime for students and educators

**7 Administrative and Compliance Functions**

Ensuring regulatory compliance and operational administration is crucial.

Functions include:

* Budgeting and procurement
* Human resources for education staff
* Reporting to DBE or Umalusi
* Compliance with POPIA and digital privacy rules

**Impact of Disruption:**

* Delays in staffing, budget approvals, and procurements
* Inability to submit mandatory educational reports
* Legal risks due to non-compliance with data handling policies

The Eastern Cape's digital education ecosystem heavily relies on the seamless function of multiple interconnected systems. By identifying and analysing the key business functions, we can prioritize which systems need rapid recovery and what processes must be protected. Ensuring continuity in these core areas is essential to maintaining access to education, especially for learners in rural communities.

**Task 2: Identify Potential Disasters & Disruptions (Eastern Cape)**

1. **Load Shedding/ Power Outage**

South Africa faces frequent load shedding due to generation shortfalls by Eskom. Rural Eastern Cape communities often face **longer power outages** with less backup infrastructure.

**Impact on Digital Education:**

* LMS servers go offline if no UPS/backups are in place.
* Students using mobile devices cannot charge them.
* No power for routers = no internet access for rural schools.
* Exams, live classes, and content downloads get delayed or interrupted.

**Mitigation Suggestions:**

* Deploy solar backups for schools.
* Offline-capable LMS modules.
* Mobile-friendly, asynchronous content delivery.

1. **Severe Weather Events (Floods, Drought, Lightning)**

The Eastern Cape is prone to **seasonal flooding**, especially in districts like OR Tambo and Alfred Nzo, and droughts that affect the Karoo regions.

**Impact on Digital Education:**

* Physical damage to ICT infrastructure (e.g., mobile towers, school server rooms).
* Disruption of road networks = delays in device and learning material delivery.
* Increased absences due to sheltering/displacement.

**Mitigation Suggestions:**

* Weather-resilient ICT infrastructure.
* Cloud backups are stored outside high-risk zones.
* Emergency SMS-based learning alerts.

1. **Connectivity Failures (Fiber Cuts, Mobile Tower Downtime)**

Many parts of the Eastern Cape rely on **mobile networks** (3G/4G) due to a lack of fiber access. Fiber cable theft and poor tower maintenance are common.

**Impact on Digital Education:**

* LMS, video conferencing, and SIS become inaccessible.
* Teachers cannot upload marks or access online records.
* Delays in learning and feedback loops.

**Mitigation Suggestions:**

* Hybrid learning packages (USB, DVD, print).
* Satellite internet for high-risk schools.
* Work with ISPs to prioritize education traffic.

1. **Cybersecurity Threats (Ransomware, Phishing, Data Breaches)**

Growing digitization of education makes school systems vulnerable. Public entities often lack advanced cybersecurity defences.

**Risks:**

* Learner academic records could be exposed.
* Exam platforms could be hijacked.
* LMS servers encrypted or taken offline.

**Impact on Digital Education:**

* Permanent data loss (without backups).
* Loss of trust and credibility.
* Potential POPIA violations and legal actions.

**Mitigation Suggestions:**

* Regular backups to the cloud.
* Cyber hygiene training for educators.
* Two-factor authentication for admins.

1. **Political Unrest or Community Protests**

Service delivery protests or unrest often led to blocked roads, disrupted schooling, and even targeted vandalism of government resources.

**Impact on Digital Education:**

* In-person school visits halted (e.g., for device repairs or training).
* Local network infrastructure destroyed.
* Staff unable to work due to safety concerns.

**Mitigation Suggestions:**

* Local community engagement.
* Decentralized, cloud-based systems accessible from anywhere.
* Portable kits for educators working from home.

1. **Vandalism or Theft of ICT Infrastructure**

Theft of solar panels, routers, laptops, and batteries is common in rural schools. Copper cable theft also affects telecom lines.

**Impact on Digital Education:**

* Students lose access to vital tools.
* Classes interrupted while infrastructure is replaced.
* Repeated losses reduce program sustainability.

**Mitigation Suggestions:**

* Community tech guardianship programs.
* Tamper-proof enclosures for hardware.
* Device tagging and tracking systems.

**Task 3**

The **Recovery Time Objective (RTO)** is the maximum amount of time a digital education system or function can be down before the impact becomes unacceptable. It helps to prioritize recovery efforts after a disaster or disruption. RTOs must reflect both technical feasibility and real-world impact, especially in vulnerable areas like rural Eastern Cape.

1. **Learning Management System (LMS)**

**Target RTO:** 4–12 hours  
**Examples**: Moodle, Google Classroom, MS Teams

**Reasoning:**

* LMS platforms are central to digital learning – they host courses, materials, assessments, and allow learners to interact with teachers.
* In Eastern Cape, where many learners depend on mobile phones, LMS downtime prevents them from submitting assignments or accessing study materials.
* Disruption worsens educational inequality, especially where alternative in-person options are limited.

**Consequences of Delay:**

* Students fall behind on assignments or miss deadlines.
* Teachers cannot track progress or offer feedback.
* Could lead to academic backlogs or reduced learner engagement.

**Local Considerations:**

* Use of offline-capable LMS content and mobile-friendly access can slightly reduce urgency but only for short periods.
* Backup LMS servers and cloud-hosted solutions are essential.

1. **Student Information Systems (SIS)**

**Target RTO:** 24 hours  
 **Examples**: Provincial SIS platforms

**Reasoning:**

* SIS manages enrolment, grade records, and academic tracking.
* While not always used daily by students, administrators rely on SIS for scheduling exams, recording marks, and regulatory reporting.

**Consequences of Delay:**

* Delays in registering learners for assessments.
* Inability to submit results to DBE or Umalusi.
* Impacts on progression and certification for learners.

**Local Considerations:**

* Many schools depend on centralized provincial SIS failure at the center affects all connected institutions.
* Paper-based backups or CSV exports can provide temporary relief, but rapid restoration is crucial for administrative continuity.

1. **Communication & Collaboration Tools**

**Target RTO:** 2 hours or less  
 **Examples**: WhatsApp groups, MS Teams, Zoom, Email

**Reasoning:**

* These platforms support real-time communication, both for teaching (virtual classrooms) and for admin alerts during crises.
* Quick restoration is vital for emergency instructions, staff coordination, and learner support.

**Consequences of Delay:**

* Classes missed or disrupted.
* Learners (especially in rural areas) feel disconnected and unsupported.
* Teachers cannot coordinate with each other or send alternative tasks.

**Local Considerations:**

* WhatsApp and SMS are often used more than email due to mobile access—thus mobile network stability is essential.
* Fallback tools like SMS alerts or community radio can help but should only be temporary.

1. **Devices and Connectivity Services**

**Target RTO:** 1–3 days  
**Examples**: Tablets, laptops, mobile data, routers

**Reasoning:**

* If students or teachers lose access to devices or data, participation in digital learning stops completely.
* Restoring access depends on logistics, availability of spares, and network coverage.

**Consequences of Delay:**

* Extended absence from class, especially for rural or disadvantaged students.
* Inability to participate in assessments, lessons, or group work.

**Local Considerations:**

* Many learners share devices at home, so even minor delays in recovery affect multiple students.
* Preloaded learning materials and offline USB-based resources can reduce short-term damage.

1. **Assessment & Examination Platforms**

**Target RTO:** 12–24 hours  
**Examples**: Moodle Quiz, Exam.net, DBE assessment portals

**Reasoning:**

* These systems are critical during assessment windows; disruptions can cause missed or delayed exams, data loss, or disputes over marks.

**Consequences of Delay:**

* Missed assessments can impact year-end progression.
* May lead to loss of confidence in digital systems.
* Time-sensitive tests (like final exams) may need full rescheduling.

**Local Considerations:**

* Eastern Cape schools using DBE systems must coordinate nationally, so downtime can affect other provinces as well.
* Exam proctoring issues (e.g., webcam, browser control) can also lead to compliance issues.

1. **Technical Support & Helpdesk Operations**

**Target RTO**: 4–8 hours

**Reasoning:**

* Helpdesks are vital to resolve issues like login problems, access errors, or hardware malfunctions.
* A responsive support system helps prevent small problems from disrupting full lessons or school operations.

**Consequences of Delay:**

* Educators stuck without help may stop teaching.
* Learners unable to access platforms or content may disengage.

**Local Considerations:**

* In remote areas, on-site tech support is limited—therefore, remote or regional call centres with multi-language capabilities are helpful.
* Empowering teachers with basic troubleshooting guides is also crucial.

1. **Administrative and Compliance Functions**

**Target RTO:** 48–72 hours

**Reasoning:**

* Includes HR, budgeting, procurement, and reporting.
* While not urgent on a day-to-day basis, these functions are essential for system sustainability and legal compliance.

**Consequences of Delay:**

* Late submissions to DBE or Umalusi.
* Violation of POPIA data handling policies.
* Delays in purchasing educational resources.

**Local Considerations:**

* Many rural schools rely on central district offices for procurement and reporting—delays here affect multiple institutions.

**TASK 4 (Recovery Point Objective)**

Eastern Cape digital education system, where the RPO reflects how often backups should be made and how much recent data (e.g., student records, assignments, exam results) can be lost without causing severe disruption.

**Recovery Point Objective (RPO) for Eastern Cape Education – Digital Systems**

|  |  |  |
| --- | --- | --- |
| **SYSTEM/FUNCTION** | **RPO TARGET** | **JUSTIFICATION** |
| LMS | 4-6 hours | There will be frequent updates, loss that is beyond 6 hours risks academic disruption. |
| Student Information Systems | 24 hours | Changes are less frequent, but they are critical such as grades. |
| Assessment/ examination data | 1 hour | There is high sensitivity, test results must not be lost. |
| Communication Platforms | 12 hours | There is moderate impact when data is lost |
|  |  |  |

**Risks of exceeding RPO**

* Loss of critical exam data
* Repetition of assignments
* Disruption of term timelines
* Loss of stakeholder trust

**Task 5: Assess Financial and Operational Impacts (Eastern Cape Digital Education)**

**1. Cost of Lost Instructional Time (Per Learner/Day)**

Based on DBE expenditure estimates and research by Equal Education (2022), the average cost to deliver schooling (including teacher salaries, materials, digital platforms) is **±R65–R120 per learner/day** in public schools. For digital learning, slightly adjusted:

**Digital Instruction (Low-Bandwidth or Mobile-Only Delivery)**

* **Cost Estimate**: R40–R60 per learner/day
* **Factors Considered**:
  + Shared device use
  + Mobile data subsidies
  + Lower energy use
  + Asynchronous materials reduce teacher live-time

**Digital Instruction (Interactive & Real-Time Delivery)**

* **Cost Estimate**: R70–R100 per learner/day
* **Factors Considered**:
  + Real-time teaching (Zoom/MS Teams)
  + High data consumption
  + Dedicated teacher-student engagement

**Example Impact**:

* In a rural school with 300 learners, an LMS outage for **2 days** =  
  **300 learners × R60 × 2 = R36,000** in lost instructional value.

**2. Cost of System Recovery (IT Support, Data Restoration)**

Cost depends on severity, local capacity, and outsourcing needs.

**Minor Issues (Login errors, minor LMS bug):**

* **Estimate**: R500–R2,000 per incident
* **Mitigation**: Handled by school IT assistant or remote helpdesk

**Moderate Recovery (Local LMS down, backup restore required):**

* **Estimate**: R5,000–R20,000
* **Includes**:
  + Data recovery
  + LMS server reboot
  + Travel cost for onsite IT technician

**Major Recovery (Data breach or system-wide crash):**

* **Estimate**: R30,000–R100,000+
* **Includes**:
  + Cybersecurity team intervention
  + Data restoration
  + Server repair or migration to cloud
  + Penalties for non-compliance (e.g., POPIA breach fines)

**Example**:  
A ransomware attack on the SIS system could cost up to **R75,000** to fully restore and ensure compliance.

**3. Productivity Loss for Educators**

Average **teacher salary in SA**: ~**R25,000/month** (±R1,250/day)  
Most digital platforms rely on **teacher interaction** through LMS, video classes, marking, and admin.

**Estimated Cost of Downtime:**

* **1 teacher’s digital productivity loss/day** = **R700–R1,250**
* For **5 teachers** offline for 2 days = **R7,000–R12,500**

**Impacts:**

* Delays in marking and grading
* Rescheduling assessments
* Reduced ability to monitor learner progress
* Extra time spent catching up, leading to burnout or overtime claims

**4. Reputational Damage and Loss of Trust**

Reputation costs are harder to quantify but have real long-term operational effects.

**Indicators of Reputational Loss:**

* Parents pull children out of digital schooling
* Funding partners or sponsors withdraw support
* Decrease in uptake of e-learning tools
* Government scrutiny and audit pressure

**Potential Impacts:**

* **Loss of future funding**: Grants, NGO partnerships (~R100,000+ per annum)
* **Loss of enrolment**: Reducing learner base decreases budget allocations
* **Public backlash**: Negative media attention harms government trust

**Estimated reputational cost (short-term incident):**

**R20,000–R150,000** depending on scope (e.g., province-wide LMS crash vs school-specific outage)

**Consolidated Sample Impact Table: Per Medium-Sized Rural School (300–500 learners):**

|  |  |  |
| --- | --- | --- |
| **Disruption Type** | **Estimated Cost Range** | **Explanation** |
| 2-Day LMS Downtime | **R36,000–R60,000** | Lost instructional value, marking delays |
| Full LMS System Recovery | **R10,000–R25,000** | Cloud backups restore, local troubleshooting |
| Educator Downtime (5 staff) | **R7,000–R12,500** | Lost teaching/admin time |
| Loss of Confidence (Community) | **R30,000–R100,000+** | Potential sponsor/NGO withdrawal or trust loss |
| **Total Potential Impact** | **R83,000–R197,500** | For a single school-level incident |

**Recommendations for Mitigation (to Reduce Financial Losses):**

* Invest in low-cost solar UPS systems (±R10,000–R15,000 per site)
* Train teachers in digital disaster protocols
* Maintain off-site backups every 6–12 hours
* Use multi-channel communication tools (SMS, WhatsApp, Radio)
* Develop "offline fallback content packs" (USBs, print kits)

**Task 6: Identify Stakeholders & Impacted Groups**

1. **Learners (Students)**

**How they're impacted:**

* Access to learning stops when LMS, devices, or data services are unavailable.
* Assessment disruptions may delay exam results or progression.
* Loss of learning momentum, especially for those with little home support or learning devices.
* Rural learners are hit hardest due to:
  + Poor mobile network coverage
  + Shared or no device access
  + No electricity to charge devices during load shedding

**Special Groups to Consider:**

* Learners with disabilities (need screen readers, captioned content, accessible interfaces)
* Orphaned or vulnerable children (often rely solely on school for learning access)
* Girls in rural households, who may face domestic task pressure when offline

1. **Teachers and Educators**

**How they're impacted:**

* Unable to deliver lessons, mark assignments, or track progress without LMS and SIS.
* Loss of communication tools (WhatsApp, MS Teams) means no classroom management or learner feedback.
* Delays in online exams disrupt the academic schedule and increase stress levels.
* Lack of helpdesk support leaves many struggling to troubleshoot tech problems alone.

**Special Considerations:**

* Many teachers lack advanced ICT training.
* Rural teachers often use personal devices or prepaid data, making outages even more disruptive.
* Teachers may become demotivated or overworked when recovery lags.

1. **School Administrators and Management Teams**

**How they're impacted:**

* Disruption in SIS and communication tools blocks:
  + Registration
  + Timetabling
  + Mark submissions
* Unable to submit reports to the Department of Basic Education (DBE) or Umalusi.
* Cannot manage procurement (e.g., buying new tablets or paying data bills) if finance systems go offline.

1. **Parents and Caregivers**

**How they're impacted:**

* Often the first to notice when digital education tools fail.
* May struggle to support learning due to low digital literacy.
* In rural homes with no internet, cannot assist learners when systems go down.
* Disruptions raise concerns about school quality and safety, leading to frustration or withdrawal of support.

1. **ICT and Technical Support Teams**

**How they're impacted:**

* Bear the burden of quick system recovery.
* Disruptions strain limited teams, especially in rural areas with no local tech staff.
* Without clear protocols, troubleshooting is delayed, and miscommunication worsens downtime.

1. **Department of Basic Education (Provincial & National)**

**How they're impacted:**

* Loss of visibility into school operations during disruptions.
* Delays in reporting hinder policy decisions and compliance monitoring.
* Pressure to answer to public, media, and Parliament if digital systems repeatedly fail.

**Special Points:**

* Must coordinate resources and support across districts.
* Need real-time dashboards or reports to track school-level recovery status.
* Responsible for funding recovery efforts, including cyber protection, device replacement, and teacher training.

1. **NGOs and Development Partners**

**How they're impacted:**

* May halt funding if systems prove unreliable or insecure.
* Need regular data to assess impact and accountability.
* Unable to deliver their programs (e.g., tablet donations, e-content rollouts) if infrastructure is offline.

1. **Vendors and Technology Partners**

**How they're impacted:**

* Must provide service-level support during outages or cyber incidents.
* Responsible for meeting uptime guarantees, backups, and maintenance.
* Face reputation risks if systems underperform, especially during assessments.