HUMANITARIAN ACADEMY · HUMANITAIRES JOBS

Mini MBA Project Management and AI: PMP, PRINCE2, Agile and PMD Pro applied to humanitarian work

Course handout · Week 6 : Planning: scope, work breakdown, estimating and critical path

A programme of exactly 3 months (12 weeks, 144 hours) to manage humanitarian projects with the main methodologies and artificial intelligence: project cycle, PMBOK and PMP, PRINCE2, Agile (Scrum, Kanban) and hybrid approaches, Project DPro (PMD Pro), logical framework, theory of change and results-based management, planning and critical path, donor budget and earned value, risks and stakeholders, MEAL, donor reporting, change management, leadership and closure. At every step, AI (Claude, Gemini, Copilot and project management tools) is used methodically, protecting the data of the people we serve. Corrected numerical exercises, three monthly exams with case studies, and a verifiable diploma from the Humanitarian Academy. Independent preparation programme: it does not award the PMP, PRINCE2 or PMD Pro certifications, which are obtained through the official exams.

https://humanitairejobs.org/en/academy/mini-mba-gestion-projet-ia/semaine-6/

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Week 6 : Planning: scope, work breakdown, estimating and critical path

Objectives

- Define the scope and build a deliverable-oriented work breakdown structure (WBS).
- Estimate durations (analogous, parametric, three-point/PERT) and calculate a critical path with float.
- Build a realistic schedule (Gantt, milestones, resources) and use AI to spot omissions and dependencies.

Scope and the work breakdown structure

The **scope** describes what the project delivers, and what it does not. A clear scope statement contains the deliverables, acceptance criteria, exclusions, constraints and assumptions. Exclusions prevent **scope creep**: "the project does not cover borehole maintenance after handover to the management committee".

The **work breakdown structure** (WBS) breaks down the work hierarchically into deliverables, down to **work packages** small enough to be estimated, assigned and tracked (often 1 to 4 weeks of work). The 100% rule: the sum of the child elements represents exactly the work of the parent element, no more, no less.

Example. Project "Drinking water for 6 villages": 1. Project management; 2. Studies (hydrogeology, consultations); 3. Boreholes (6 boreholes, pumping tests, analyses); 4. Management committees (set-up, training); 5. Hygiene promotion; 6. Closure and handover. Each element is then broken down further. The **WBS dictionary** describes each package: content, owner, deliverable, criteria.

Estimating durations and effort

Four main techniques:

- **Analogous**: from a similar project (fast, not very precise);
- **Parametric**: from a ratio (for example 3 days of works per latrine per team);
- **Bottom-up**: estimating each WBS package and adding up (precise, long);
- **Three-point (PERT)**: with an optimistic (O), most likely (M) and pessimistic (P) estimate. Expected duration = (O + 4M + P) ÷ 6; standard deviation ≈ (P − O) ÷ 6.

Example. Customs clearance of medical equipment: O = 3 weeks, M = 4, P = 11. Expected duration = (3 + 16 + 11) ÷ 6 = 5 weeks, not 4: the risk of blockage pulls the estimate up. In humanitarian work, pessimistic durations (rainy season, access, authorisations) are often underestimated; involve logistics and security in estimating.

The network and the critical path

Activities are linked by their **dependencies** (most often "finish to start": B starts when A is finished). We then calculate:

- **early dates** (forward pass): the earliest start date of each activity;
- **late dates** (backward pass): the latest finish date without delaying the project;
- **total float**: the difference between late and early.

The **critical path** is the longest sequence of dependent activities; its activities have zero float. Any delay on the critical path delays the end of the project.

Example. A Site assessment (2 weeks); B Purchase of materials (4, after A); C Recruitment of teams (2, after A); D Training (1, after C); E Works (6, after B and D); F Acceptance (1, after E). Paths: A-B-E-F = 13 weeks; A-C-D-E-F = 12 weeks. Critical path: A-B-E-F, duration 13 weeks. C and D have one week of float. To shorten the project, act on procurement (B), not on recruitment.

Compressing a schedule

When the donor or the season imposes an earlier date:

- **fast tracking**: doing in parallel activities planned in sequence (starting works on the first sites before all purchases are complete). Low cost, higher risk of rework;
- **crashing**: adding resources to critical activities (a second team, air freight). Higher cost; choose the critical activities whose cost per week gained is lowest.

Careful: compressing a non-critical activity is useless, and a new critical path may appear. In the example above, reducing B by 2 weeks gains only one week: path A-C-D-E-F (12 weeks) becomes critical.

Gantt, milestones and resources

The **Gantt chart** shows activities on a timeline; it is readable by everyone, including the donor. **Milestones** are added (events with no duration: contract signature, interim report, handover).

Then **resources** must be checked: the same engineer cannot supervise three sites 300 km apart in the same week. **Resource levelling** shifts activities to respect availability, which may lengthen the project; **smoothing** shifts them only within their float.

Build the **real calendar** into the schedule: rainy season, religious holidays, election periods, procurement lead times (week 8) and recruitment, authorisation procedures. A humanitarian schedule with no margin for access and security is a wrong schedule.

Tools: a spreadsheet is enough for a small project; software such as MS Project, ProjectLibre (free), Smartsheet, Asana, monday.com or Jira suits larger ones. Many now include AI features.

Planning with AI

Useful requests:

- "From this scope, propose a deliverable-oriented WBS on 3 levels, respecting the 100% rule. Flag deliverables the scope does not specify."
- "Here is the list of activities and durations: identify missing dependencies and activities often forgotten in this type of project (authorisations, testing, training, handover, financial closure)."
- "Calculate the critical path of this table and show the detail of the forward and backward passes."

Always check the critical path calculation: AI assistants sometimes make mistakes in additions or multiple dependencies. For calculations, ask to see the detail, or use a spreadsheet or scheduling software. Do not share sensitive data on the exact location of teams or stocks in insecure areas.

Exercise: critical path and compression

Situation. Shelter project of the fictitious NGO Sakan. Activities: A Family registration 3 weeks; B Ordering kits 5 weeks (after A); C Site selection 2 weeks (after A); D Site preparation 3 weeks (after C); E Shelter assembly 4 weeks (after B and D); F Quality control 1 week (after E). The donor asks for completion in 12 weeks. Air freight for the kits: B becomes 3 weeks for USD 18,000.

Task. 1) Duration and critical path? 2) Float of C and D? 3) Does air freight make 12 weeks possible? What is the new critical path?

Answer. 1) A-B-E-F = 3 + 5 + 4 + 1 = 13 weeks; A-C-D-E-F = 3 + 2 + 3 + 4 + 1 = 13 weeks. Two critical paths, duration 13 weeks. 2) Zero float for C and D (they are critical too). 3) With B at 3 weeks, A-B-E-F = 11, but A-C-D-E-F remains at 13: the project still lasts 13 weeks. Air freight alone is useless; C or D must also be shortened by one week (for example a second site preparation team), or D and E overlapped.

Key takeaways

- The scope specifies deliverables and exclusions; the WBS breaks down all the work (100% rule).
- PERT estimate: (O + 4M + P) ÷ 6; involve logistics and security in estimates.
- The critical path is the longest sequence of dependent activities; its activities have zero float.
- Compressing a non-critical activity does not shorten the project; watch for a new critical path.
- AI proposes WBS and dependencies; check its calculations and build in the real field calendar.

Quiz

1. The 100% rule of the WBS means:
   A. The budget is 100% spent
   B. Child elements represent exactly the work of the parent
   C. Each activity lasts 100 hours
   D. The team is 100% available

2. PERT estimate with O = 2, M = 5, P = 14:
   A. 5
   B. 7
   C. 6
   D. 8

3. An activity on the critical path has a total float of:
   A. Zero
   B. One week
   C. Its own duration
   D. Always negative

4. Doing in parallel activities planned in sequence is called:
   A. Levelling
   B. Crashing
   C. Smoothing
   D. Fast tracking

5. Shortening a non-critical activity:
   A. Always shortens the project
   B. Does not shorten the project
   C. Lengthens the project
   D. Removes the critical path

Quiz answers : 1. B · 2. C · 3. A · 4. D · 5. B