Collaborative features in French public e-procurement

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Abstract: Public e-procurement is the use of electronic means for publishing, processing, exchanging and storing all the information related to institutional purchases and provisioning in public organizations. It requires complex technological tools which must comply with legal and organizational constraints. In this paper, we analyse cooperative aspects in public purchase processes through the detailed study and the modelling of a particular purchase procedure. The obtained model is used to identify all the stages and process steps likely to be virtualized\(^1\) through the use of electronic collaborative tools. This analysis is then the basis of a critical evaluation of five major e-procurement platforms currently used in France.

1 Introduction

For several years, the development of information and communication technologies triggered numerous mutations in all private and public economic sectors. In this dynamic context, public organizations try to take into account these evolutions and implement e-government applications. E-government is a general term describing the application of e-commerce principles to administrative procedures and the use of the Internet network to interconnect information systems of administrations, local authorities, enterprises and citizen's homes. E-government applications can be classified into several categories depending on the implicated actors: G2C when it is about exchanges between government and citizens; G2B to when it is about exchanges between government and enterprises and G2G to when it is about exchanges between governmental structures.

\(^1\) We will use the term "virtualization" and the verb "to virtualize" to denote the process of moving an activity (or a set of activities) from a physical, paper based form to a computer and/or internet based form.
A key feature of e-government G2B applications is moving the public sector's procurement processes to electronic platforms [Ton03]. It means the use of electronic channels for publishing, processing, exchanging and storing all the information related to institutional purchases in public organizations. Public e-procurement is an important stage in the e-government development, and economic stakes are probably considerable. Public orders in the European Union (EU) - orders of supplies, services and public works - represented 16% of the European Union's GDP, or 1500 billions of euros in 2002 [EuP06]. Its importance varies meaningfully according to the state member and can be located between 11% and 20% of the national GDP. In France, it represents about 10% of the GDP, or about 180 billions of euros per year [JMS05].

Following the general trend of public services modernization and administrative procedure simplification, public e-procurement has been introduced in France in 2001, and is in application since January 1st, 2005 for all public purchases beyond certain amounts. The adoption of electronic means for public procurement is a fundamental organizational stake since it permits the evolution of governmental procedures and a reduction in their length, a higher degree of procedures transparency, and will contribute to the emergence of a European market [Lom04].

Public e-procurement platforms are similar to B2B marketplaces in the private sector; they can provide support for a certain form of collaborative work [Pap05, WW05]. Whereas the legal framework imposes only a minimum in term of electronic means use, the available platforms seem to allow much more. Does the use of electronic channels in public purchase makes it possible to gradually set up a collaborative workspace between the public services and its usual and potential suppliers? This is the basic question that our research tries to answer.

In this paper, we define first the general framework for public purchase and the different procedures of public contracts. Second, we propose to model a particular procedure – call for tenders – for a better identification of possible zones of virtualization. Using the obtained model, we analyze then the cooperative aspects of the procedure which are likely to be virtualized. Finally, in the light of this analysis, five major e-procurement platforms used in France are reviewed and evaluated.

### 2 Public purchase procedures

In this section, we briefly present notions relative to public purchase procedures and a classification of all available types.
2.1 Definition of a public contract

A public contract is a purchase and a provisioning transaction issued by a public organization. It is an exchange of assent between two parts; one is public whereas the other is private. The public contract is constrained by the public procurement contracts code, and can be realized by a private supplier, an individual or a corporative [CMP04]. The notion of public contract covers vast panoply of public purchase types. All economic fields are concerned: computing, telecommunication, restoration, office articles, furniture, car acquisition and renting, constructions, consulting, auditing, etc. There is however an important distinction between three categories of public contracts: public works contract, public services contract and public supplies contract.

2.2 Public procurement principles and conduct

According to the public procurement contracts code (CMP, *Code des Marchés Publics*), the relationship between the two contracting parts concerned by a public purchase implies the signing of a contract and the transfer of a financial amount in accordance with certain rules. These rules are: (i) free of access to all information related to the public purchase order, (ii) equal processing of all received tenders, (iii) and the global transparency of the whole procedure.

The economically most advantageous offer will be selected. To be able to make the best choice, criteria's will be defined according to the nature of the purchase, notably the technical value of the tender, its innovating character, its cost of use, the execution delay, aesthetic and functional qualities, after-sales service and technical support, etc. These contract award criteria's are weighed and are clearly defined in the constituent part of the public order. They are defined in the public contract notice (AAPC, *Avis d'Appel Public à la Concurrence*), in the tender documents for companies (DCE, *Dossier de Consultation des Entreprises*), in the act of engagement, in the specifications of the order, etc. Thus, the best classified tender will be officially retained after production by the concerned company of all documents and justifications necessary to the attribution.

3 Typology of public procurement procedures

To express his need, the public order issuer has two logics of purchase. For orders below the threshold fixed by the CMP, he can opt for an adapted procedure known as the (MAPA, *Marché À Procédure Adaptée*) procedure. Beyond the threshold, he must resort inevitably to a formalized procedure which offers a higher degree of legal safety. Thus, the choice of the ordering procedure depends on the amount of the purchase and on the nature of the ordered item. Certain procedures are for example reserved for software requirement engineering missions while others for the execution of public works, etc.
3.1 Adapted procedures (MAPA)

In this procedure, the person responsible for the order (PRM, Personne Responsable du Marché), according to the nature of the purchase and its characteristics, has a total liberty in fixing the specificities of the order and the methods of publicity and competition. It can concern all types of purchase. For services and supplies, this procedure is possible for purchase lower than 150k€ for a state agency and 230k€ for a local authority. For constructional works, this procedure is possible for all purchase lower than 230k€.

In an adapted procedure, the purchaser disposes of certain autonomy in fixing of the order modes, but it is by no means a free procedure. Indeed, he must be extremely heedful to respect the constraints imposed by the law, the penal risk is higher in this type of procedure.

3.2 Formalized procedures

Beyond the thresholds quoted previously, the formalized procedure becomes mandatory for the public purchaser. There are 5 different versions of the formalized procedure for expressing his needs:

- **The call for tenders**: According to the public procurement contracts code, a call for tenders is "the procedure by which the public person chooses the most economically advantageous offer, without negotiations, on the basis of objective criteria previously brought to the attention of the candidates ". The call for tenders can be an open tendering or a limited tendering. In open tendering, all candidates can submit a tender. In limited tendering, only selected candidates can submit a tender. In both cases, a call for tenders is systematically preceded by a public contract notice. The contract will be awarded by the person responsible for the order, after opinion of the commission for call for tenders.

- **The negotiated procedure**: It is a "procedure by which the public person chooses the holder of the order after discussing with potential candidates and negotiating the conditions of the order with one or several among them". The negotiated procedure can be passed with or without previous advertisement and with or without call for competition. After negotiation, the most advantageous tender will be selected on proposal of a specific commission.
The procedure of competitive dialogue: The public purchaser can resort to this procedure when it is impossible for him to define the technical means which can satisfy the contract requirement, or when he is not able to define the legal and/or the financial specification of the project. According to this procedure, the public purchaser specifies a functional program including the desired results or the requirements to satisfy. This specification will then be subject to proposals from candidate enterprises. Preceded by a public contract notice, this procedure is conducted through a dialogue between the purchaser and the retained candidates. The candidates make proposals based on requirements specification. After classification of the tenders, the most advantageous one will be selected by the person responsible of the order after opinion from a specific commission.

The procedure of design & implementation: According to the public procurement contracts code, the public purchaser can resort to this type of procedure only when the contract relates simultaneously on the design of a project and on the realization of a public works. Therefore, the public contracts passed according to this procedure are constructional works contracts. After selecting a list of potential candidates by a specific jury, the person responsible for the contract awards the contract to the most advantageous offer.

The contest procedure: It is the procedure by which the public purchaser chooses a provider based on a jury's opinion in a prize-winning contest. This type of procedure is generally used in the domain of regional development, urbanism, architecture and engineering or data processing. Concretely, it is about selecting the best technical design offered. The procedure of contest can be open to all candidates or can be restrict to some selected candidates.

4 Analysis of cooperative situations

The logic of effective cooperative work is closely related to the logic of business processes. The majority of business processes are normally collaborative work processes since they imply in general several actors. In the research work done at GET on the virtualization of public procurement [ABB06], we applied this point of view to the procedures of public purchase. In what follows we will present the application of this logic to the purchase procedure of call for tenders. It is a procedure which is very often used by public organizations and which by its nature offers several prospects for electronic cooperation.

To model this procedure, we will use the MeDICIS method and will use its model of coordination [Bou01]. This model is then the support for a very fine analysis of the collaborative and "virtualizable" situations according to an adapted version of the matrices proposed by MAIN method [Lev04].
4.1 The Methodology for Designing Co-operative Information System MeDICIS

MeDICIS (Methodology for Designing Inter-enterprise Co-operative Information System [Bou01]) is a methodology for guiding the design of inter-agents cooperation mechanisms (human, group of humans and/or machines). The first step is to analyze then to model cooperative processes according to three levels of depth (communication, coordination and collective problem-solving). The second step is to specify computer-based tools adapted to the needs and the constraints of the cooperative process, in order to be able in the third step to manage the knowledge used and generated by this cooperation.

Two levels of modelling are identified by MeDICIS: a macro level corresponding to the general context of cooperation, and a micro level which deals with the course of cooperation itself. Several models are suggested at these two levels, at the macro level - which is of most interest for us here - we mention:

– The Agent Model which describes the different types of agents, their features and their relationship (for example, an agent can be artificial, actor, group of actors or an organizational entity (business unit), with its specific knowledge, its competencies, its qualifications, its roles, etc.)

– The coordination model that determines the course (progress) of coordination activities between agents, their roles, the necessary resources, entry and exit flows, etc.

4.2 Modelling of the purchase procedure "open call for tender"

The complete modelling of this procedure is presented in appendix 1 [Kha05]. It is a sequential succession of elementary activities. However, at various times of the procedure, several alternatives can be available:

• After publishing the call for tender and putting the corresponding documents for companies online (DCE, *Dossier de Consultation des Entreprises*) on line (activity n°4): if the procedure is urgent and the call for tender relates to a constructional works contract lower than 5.9M€, then the withdrawal period before recording and opening of the folds is 15 days; if there was pre-information or the call for tender relates to a constructional works contract higher than 5.9M€, then the withdrawal period before recording and opening of the folds is of 22 days; otherwise, the delay is 52 days.

• After reception of the folds (activity n°5): If the contract emanates from a local authority, then the recording, the opening of the folds and the drafting of the report are made by the board of the call for tender, if not (contract issued by the state) it is done by the person who is responsible for the contract (PRM: *Personne Responsable du Marché*).
- Après enregistrement et ouverture des pliages (activité n°7) et possible réalisation de la proposition (activité n°8) : la sélection des candidats est faite différemment en fonction de la nature de l’acte, c’est-à-dire le contrat d’une autorité locale ou d’un contrat de l’état ; dans ce dernier cas, la comité de l’appel à projets doit faire part de leur opinion sur les candidats avant la sélection.

- Après examen des offres (activité n°14) : le contrat peut être déclaré sans résultat si aucun projet ne satisfait.

- Après classification des offres (activité n°16) : selon que le contrat est signé par une autorité locale ou par l’État, l’évaluation des offres et la sélection du projet le plus avantageux sont effectués différemment.

- Après demande de la taxe et du rapport social du candidat sélectionné (activité n°20) : si les documents demandés n’arrivent pas à temps, le contrat est attribué au candidat suivant selon l’classification réalisée précédemment.

La dernière activité de la procédure (le paiement au candidat ayant gagné le contrat après avoir exécuté le travail demandé) n’est pas détaillée car elle est liée à un aspect complémentaire de la procédure qui dépasse le cadre de cette étude.

4.3 Analyse des situations coopératives

Dans le modèle précédent, plusieurs activités sont de nature coopérative et peuvent donc être virtuelles si les outils adéquats sont disponibles. Chaque activité correspond à une situation de travail et d’interaction particulière qui doit être étudiée et analysée pour fournir des outils collaboratifs convenables en fonction des besoins et contraintes correspondants. Pour mener à bien cette analyse, nous utilisons une version adaptée des matrices d’analyse des situations coopératives (Figure 1), initialement proposées par la méthode MAIN [Lev04].

En utilisant ces deux matrices, il est possible de vérifier d’une part si une activité est distribuée ou synergique avec des interdépendances fortes ou faibles entre les acteurs (à travers la matrice de travail) ; et d’autre part, de vérifier si les pratiques sont marquées par une cohérence ou une co-tolance faible ou fortes interactions entre les acteurs (à travers la matrice de communication). Dans le modèle présenté en annexe 1, toutes les activités "virtuelles" sont numérotées. Afin d’en faire une analyse aussi détaillée que possible, certaines activités ont été décomposées en activités élémentaires. Ces activités décomposables sont visibles dans le tableau de l’annexe 2.

En utilisant cette analyse, nous pouvons maintenant choisir les outils collaboratifs les plus appropriés pour les situations identifiées. Cela est fait en fonction de la typologie des outils de travail collaboratifs proposé dans [BoK05] qui identifie trois catégories principales d’outils collaboratifs :

- Outils de communication : e-Mail, Chat, Audio/Visio/Web Conference, Mailing lists, Forum, EDI, Blog, Electronic repository…
Figure 1: The two matrices of collaborative situations analysis (matrix of work on the left and matrix of communication on the right)

- Tools for coordination: Workflow, Shared calendar, Project management, Content management, File sharing, Wiki, Library...

- Tools for Collective Problem-Solving:
  - Tools of Knowledge sharing: White table, Shared Application, FAQ, Cartography of Competences...
  - Tools of Knowledge access: Search engine, GDSS, Ontology, Survey...

The table in appendix 2 presents the result of the analysis of each cooperative and "virtualizable" situation identified in the call for tender purchase procedure.

5. Evaluation of electronic platforms for public procurement

We have studied all available electronic platforms which support the public procurement process in France [San05]. We present here only five platforms, those that seem to be the most significant:

1. www.ixarm.com: this platform is specifically designed for the DGA (General Delegation of the Army), and is devoted to the purchase of the weapons, ammunition and weaponries. It was developed by France Télécoms, E-Business and Cape Gemini Ernst & Young using open software technologies (SPIPE, Php/MySQL).

2. www.achats.defense.gouv.fr: This platform for all other purchases of the ministry of the defence also developed with open source software (Spippe, Apache, Php/MySQL).
3. **www.achatpublic.com**: this platform has been adopted by all ministries. It has been developed using the J2EE standard (JSP + Servlets) by the UGAP (General Union for Public Purchases, *Union Générale des Achats Publics*) in collaboration with the CDC (Governmental Treasure Agency, *Caisse des Dépots et des Consignations*), France Telecom, Dexia and The Monitor.

4. **www.e-bourgogne.com**: "E-Bourgogne Marchés Publics" is an electronic platform specifically developed for the region of Bourgogne using the Php/MySQL tools.

5. **Adema Marchés Publics**: is a customizable platform developed by the Adesium/Comètris society. The Adesium platform is actually used by some local authorities (Val d'Orge, Ville d'Orsay) and regional councils (www.adema-mp.com/cg91 for the Essonne region).

The following criteria's have been used to evaluate the presented platforms. These criteria's have been derived by analyzing general requirements for each public purchase procedure (presented in section 2 and 3), and by interviewing some public e-procurement stakeholders [Bou05]:

- **Functional perspective**
  - Support of all types of public contracts
  - Support for the whole public order procedure
  - Downloading calls for participation and calls for tenders
  - Sending proposals and replies to call for tenders
  - Support for reverse bidding

- **User centred perspective**
  - Ergonomics and simplicity of graphical interface
  - Editorial content
  - Online help
  - Collaborative tools availability

- **Technical perspective**
  - Security mechanisms implemented
  - Software tools used for the development of the platform
Table 1 presents the result of the evaluation for the five platforms. The study is based on online product documentation, and complementary information available in various websites (zdnet, 01informatique, etc.). We have also gathered some precious data through tests and trials achieved directly on the platform (when it was possible).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Security mechanisms implemented</th>
<th>Collaborative tools availability</th>
<th>Online help</th>
<th>Editorial content (news, FAQ...)</th>
<th>Ergonomics and simplicity of the graphic interface</th>
<th>Support for reverse bidding</th>
<th>Sending proposals and replies to call for tenders</th>
<th>Downloading calls for participation and calls for tenders</th>
<th>Support for the whole public order procedure</th>
<th>Support of all types of public contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>5</td>
<td>+++</td>
<td>+++</td>
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<td>?</td>
<td>?</td>
<td>?</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

Table 1: comparison and evaluation of 5 public e-procurement electronic platforms

On the basis of this comparative study, the following can be concluded:

- Even if there are many different types of public contracts (depending on the nature of the ordered product and on the total amount of the order), they seem to be supported by all the studied platforms.

- Reverse bidding is not always supported, whereas getting the lowest price is often an important issue for public institutions.

- Main web technologies are present, but open source software seem to prevail.
All studied platforms have been developed by external software providers.

Most studied platforms do not provide collaborative tools (chat, shared agenda, electronic mail, forum, etc.).

6. Conclusion

Public e-procurement is a strategic goal in the development of e-government applications in France and in the European Community [Ton02, Lom04]. The work presented in this paper is a result of a research project conducted at the GET² research labs and dedicated to the study of public e-procurement processes and tools in France [ABB05].

In this paper, we have studied public procurement procedures, and we have modelled the call for tender purchase procedure using the coordination model proposed by the MeDICIS methodology. The obtained models helped us in identifying and in analysing all the collaborative situations that occur in this particular procedure. This analysis shows that the collaborative dimension is fundamental in public purchase procedures. And like some other authors [WW05], we tend to believe that there are still many possibilities for introducing electronic collaborative tools in the public e-procurement processes. The evaluation of main electronic platforms actually deployed in France to support these processes consolidates this opinion. This evaluation shows also that many platforms have been developed, but for the moment, there seem to be no technological standard and no general pattern for the supported processes. To have another perspective on the public e-procurement evolution, we are actually empirically investigating the usage perspective through an online survey [BBe06].

References


[EuP06] European directives for public procurement.


Appendix 1: "Call for tenders" procedure modelling
Appendix 1: (continue)
Appendix 1: (continue)

**Inform the candidates** about the result of the selection process, the name of the winner, the fixed amount of the contract and the reasons of the choice.

Specific resources for the contract realization

Know how and technical knowledge:

Redevelopment project table

Select the candidate

Pay the candidate

Conclude the grid for payment and settlement structure

Assigned candidate

PRM

PRM

PRM

Economic analysis form

Assignment notification

- Candidate

- Candidate

- Candidate

- Candidate

- Candidate

- Candidate
Appendix 2: Collaborative tools selection table

(*): These activities have an important aspect related to security management. For all these activities, it is necessary to use solutions which combine collaborative and secured features (electronic signatures, secured connections etc.).

<table>
<thead>
<tr>
<th>Action</th>
<th>Working situation</th>
<th>Communicating situation</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2: Prepare tender documents for companies</td>
<td></td>
<td></td>
<td>Library, Mail, Instantaneous messenger</td>
</tr>
<tr>
<td>A3: Publish public contract notice</td>
<td></td>
<td></td>
<td>Library, Diffusion list, Mail, File sharing, Electronic directory</td>
</tr>
<tr>
<td>A4</td>
<td></td>
<td></td>
<td>Library, Mail, Awareness, File sharing</td>
</tr>
<tr>
<td>A4.1: End/Put on-line DCE</td>
<td>Individual Distributed</td>
<td>Weak interactions X Coherence practices</td>
<td>Library, Mail, File sharing, Electronic directory</td>
</tr>
<tr>
<td>A4.2: Receive/Download DCE</td>
<td></td>
<td></td>
<td>Library, Mail, Awareness, File sharing</td>
</tr>
<tr>
<td>A5</td>
<td></td>
<td></td>
<td>Library, Mail, File sharing</td>
</tr>
<tr>
<td>A5.1: Send the folds (*)</td>
<td></td>
<td></td>
<td>Library, Mail, Awareness, File sharing</td>
</tr>
<tr>
<td>A5.2: Receiving the folds (*)</td>
<td></td>
<td></td>
<td>Library, Instantaneous messenger</td>
</tr>
<tr>
<td>A6 (State contract)</td>
<td></td>
<td></td>
<td>Library, Instantaneous messenger</td>
</tr>
<tr>
<td>A6.2: Save the content of the folds (*)</td>
<td></td>
<td></td>
<td>Library, Mail, Awareness, File sharing</td>
</tr>
<tr>
<td>A6.3: Write an official report</td>
<td></td>
<td></td>
<td>Library, Instantaneous messenger</td>
</tr>
<tr>
<td>A7 (Local authorities contract)</td>
<td></td>
<td></td>
<td>Audio/Visio/Web Conference, White board, Shared edition, Chat, Instantaneous messenger, Library</td>
</tr>
<tr>
<td>A7.2: Save the content of the folds (*)</td>
<td></td>
<td></td>
<td>Shared edition, White board, Audio/Visio/Web Conference, Library, File sharing,</td>
</tr>
<tr>
<td>A7.3: Write an official report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A8: Complete the fold (*)</td>
<td>Individual Distributed</td>
<td>Weak interactions X Coherence practices</td>
<td>Mail, Library, Awareness, Chat, Instantaneous messenger</td>
</tr>
<tr>
<td>A9</td>
<td>Select candidate (CAO)</td>
<td>A10</td>
<td>Evaluate candidates (CAO)</td>
</tr>
<tr>
<td>----</td>
<td>------------------------</td>
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</tr>
<tr>
<td>A11</td>
<td>Inform the rejected candidates</td>
<td>Individual</td>
<td>Weak interactions</td>
</tr>
<tr>
<td>A12</td>
<td>Open the 2nd envelope (*)</td>
<td>Collective</td>
<td>Strong interactions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>A13</td>
<td>Save content 2nd envelope (*)</td>
<td>Collective</td>
<td>Strong interactions</td>
</tr>
<tr>
<td>A14</td>
<td>Offers examination according to selection criteria's previously published</td>
<td>Individual</td>
<td>Weak interactions</td>
</tr>
<tr>
<td>A15</td>
<td>Declare the contract as unfruitful</td>
<td>Individual</td>
<td>Weak interactions</td>
</tr>
<tr>
<td>A16</td>
<td>Classify the offers</td>
<td>Collective</td>
<td>Strong interactions</td>
</tr>
<tr>
<td>A17</td>
<td>Evaluate and select offers (CAO)</td>
<td>Collective</td>
<td>Strong interactions</td>
</tr>
<tr>
<td>A18</td>
<td>Select the most advantageous offer (CAO)</td>
<td>Collective</td>
<td>Strong interactions</td>
</tr>
<tr>
<td>A19</td>
<td>Evaluate the offers</td>
<td>Collective</td>
<td>Weak interactions</td>
</tr>
<tr>
<td>A19.2</td>
<td>Write an official report</td>
<td>Collective</td>
<td>Weak interactions</td>
</tr>
<tr>
<td>A20</td>
<td>Request the tax and social certificate from the selected candidate. (*)</td>
<td>Collective</td>
<td>Weak interactions</td>
</tr>
<tr>
<td></td>
<td>Action</td>
<td>Roles</td>
<td>Interactions</td>
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</tr>
<tr>
<td>A21</td>
<td>Inform the candidates</td>
<td>Individual X Distributed</td>
<td>Weak interactions X Coherence practices</td>
</tr>
<tr>
<td>A22</td>
<td>Contract development with the selected candidate</td>
<td>Collective X Synergic</td>
<td>Strong interactions X Cohesive practices</td>
</tr>
<tr>
<td>A23</td>
<td>A23.1: Sign the contract agreement (*)</td>
<td>Collective X Synergic</td>
<td>Strong interactions X Cohesive practices</td>
</tr>
<tr>
<td></td>
<td>A23.2: Publish contract attribution</td>
<td>Individual X Distributed</td>
<td>Weak interactions X Coherence practices</td>
</tr>
<tr>
<td>A24</td>
<td>Send assignment notification + census form</td>
<td>Individual X Distributed</td>
<td>Weak interactions X Coherence practices</td>
</tr>
</tbody>
</table>