

# University of Kentucky

## Establishment of Student Recognition Awards and Prizes Memorandum

**To:** Ajay Sharma, Assistant Deputy Director of Financial Services at the University of Kentucky

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**Subject:** Establishing Student Recognition Awards and Prizes.

We have completed the conceptual modeling of a system that will help the University of Kentucky in processing student recognition awards and prizes.

### Description of EER diagram:

1. **AWARD:** It is in the form of gifts or cash that may be made to the students at the University of Kentucky by the university for the purpose of recognition. It has attributes like Award\_Id (Primary Key), Purpose, Category, Source\_of\_Funds, Criteria, Value, Description, and Type.
2. **PROCUREMENT CARD:** It is provided to the staff to purchase gifts. Attributes are Card\_No (Primary Key), Cardholder\_Name, Spend\_Limit, and Validity\_Duration.
3. **UNIVERSITY EMPLOYEE:** It includes all the employees of the university. It is further specialized into Approving Official and Non-Approving Official (Disjoint specialization). Its attributes are Employee\_Id (Primary Key) and Department\_Name.
4. **APPROVING OFFICIAL:** It approves awards, and it is specialized into Provost, Dean and President (Disjoint Specialization).
5. **PROVOST:** It can approve awards and heads the provost office.
6. **DEAN:** It can approve award.
7. **PRESIDENT:** It can approve award.
8. **NON-APPROVING OFFICIAL:** It cannot approve awards but can request card or PRD. It is specialized into Cardholder, Business Officer and Supervisor (Overlapping Specialization).
9. **CARDHOLDER:** It can request card to purchase gifts and it owns that card.
10. **BUSINESS OFFICER:** It can also be a cardholder.
11. **SUPERVISOR:** It can also be a cardholder.
12. **PAYMENT REQUEST DOCUMENT:** It is used to purchase award. Transaction\_Id is attribute and a primary key.
13. **PBS Form:** - It is attached to every PRD and has PBS\_Id as attribute and a primary key.
14. **PROVOST OFFICE:** It is headed by the provost, and it has attribute Provost\_Id (Primary Key).
15. **UNIVERSITY FINANCIAL SERVICES:** The UFS approves procurement card, and it also sends payment copies to OSFA. It has attributes like Request\_Id (Primary Key) and Request Type.
16. **OFFICE OF STUDENT FINANCIAL AID:** The OSFA accepts payment copies from UFS, and it has attribute OSFA\_Request\_Id (Primary Key).

### Relationships:

1. **PURCHASE\_VIA\_CARD:** It is a relationship between Procurement Card and Award. There is partial participation of both entities as Procurement card can be used to purchase things other than awards. Similarly, an award can also be purchased using any other medium like PRD. In terms of Cardinality, it is 1: N ratio as one card can purchase multiple awards.
2. **PURCHASE\_VIA\_PRD:** It is a relationship between Payment Request Document and Award. There is total participation of Payment Request Document because it exists to purchase award only. On the other hand, Award can be bought using other medium like Procurement Card. In terms of cardinality, it is 1:1 as one Payment Request Document can purchase only one Award.

3. **OWNS:** It is a relationship between Procurement Card and University Employee. There is total participation of Procurement Card as it must have some owner, on the other hand University employee has partial participation, because it is possible for University Employee to not own any card. In terms of cardinality, it is 1:1 ratio as every card will be owned by exactly one university employee and vice versa.
4. **APPROVES\_THE\_REPORT:** It is a relationship between the Approving Official and Award. There is total participation of Award as it must be approved by an Approving Official, while Approving Official has partial participation, as it is possible for Approving Official to withhold approving of award for some reason. In terms of cardinality, it is 1:N ratio as every award will be approved by exactly one Approving Official but one Approving Official can approve many awards at the same time.
5. **SUBMITS:** It is a relationship between the University Employee and Payment Request Document. There is total participation of Payment Request Document as it must be submitted by a University Employee, on the other hand University Employee has partial participation, as it is possible for University Employee to not submit any PRD. In terms of cardinality, it is 1:N ratio as University Employee can submit multiple PRDs, but one PRD can only be submitted by exactly one University Employee.
6. **APPROVES:** It is a relationship between the Procurement Card and University Financial Services (UFS). There is total participation of Procurement Card as it must be validated by UFS, while UFS has partial participation because it can withhold the approval for some reason. In terms of cardinality, it is N:1 ratio as multiple Procurement Cards can be approved by UFS at the same time, but there will be only one UFS which can approve all the cards.
7. **SEND\_PAYMENT\_COPIES:** It is a relationship between University Financial Services (UFS) and Office of Student Financial Aid (OSFA). There is total participation of both entities as UFS must send payment copies to OSFA and OSFA must process all the payment copies they receive. In terms of cardinality, it is 1:1 ratio as there is exactly one UFS and one OSFA that can participate in this relationship.
8. **INCHARGE\_OF:** It is a relationship between the Provost and Provost Office. There is total participation between the entities as every provost will have a provost office and every provost office is led by a provost. The cardinality is 1:1 as one provost office will have exactly one provost and vice versa.

#### **Specializations in EER diagram:**

In terms of specialization, we have specialized University Employee into Approving and Non- Approving Official. And we have further specialized Approving Official into the President, Provost, and Dean. We have specialized Non-Approving Official into Supervisor, Cardholder and Business Officer. All these officials are by default University Employees and will have unique Employee ID associated with them. So, it is appropriate to makes these specializations.

#### **Important Controversies in Design and how we addressed it:**

1. A controversy arose on whether to implement nested specializations of University Employee into Approving and Non-Approving Official, further specialization of Approving Official into the President, Provost, and Dean, and Non-Approving Official into Supervisor, Cardholder and Business Officer. To address this controversy, first, we thoroughly went through the reading materials and came across the concept of Specialization lattices. We understood that it is a common practice to apply multiple specializations and “Student Awards” use case fits perfectly with this scenario.
2. Deciding participation of two entities, the University Financial Services (UFS) and the Office of Student Financial Aid (OSFA) was another controversy. Initially, we thought that OSFA will be partially involved in this relationship, as it was difficult to identify whether all payment requests will go through OSFA. After carefully reading the documents and contemplating among ourselves, we came to the consensus that both entities must have total participation.

**Contributions of each group member:** During our group meetings, all of us collectively analyzed the document which includes identifying entities, attributes, and relationships. Also, we collaboratively made a diagram in draw.io tool and wrote the memo.

**Amol S Govekar:** Amol worked on identifying cardinalities/participation among entities and their relationships.

**Hrishikesh Potdar:** Hrishikesh worked on determining the specializations/generalizations in EER diagram.

**Jun Liu:** Jun reviewed the format of the draw.io diagram and amended the EER diagram.