In the explained problem in the modern world, blockchain can benefit people, educational institutions, and employers. These benefits can be listed below:

- it can maintain ownership of the certifications and degrees;
- it can ensure the integrity of the certifications and degrees;
- it can provide the exact date, grade, and duration of the certifications and degrees;
- it can ensure the source of the certifications and degrees.

Let's discuss briefly how blockchain technology can pull off this work. Let's assume that everyone attending for a certification or degree has a blockchain address. It doesn't matter if it is a special kind of blockchain or a normal public blockchain such as Bitcoin or Ethereum. The attendee goes to the educational institution and gives her ID alongside her blockchain address at the beginning. The institute verifies the ID and asks the attendee to verify the ownership of the blockchain address.

From this point, if the attendee is successful in getting the certification, the institute can create a transaction from its verified address to the attendee's address, and it can leave a comment mentioning everything that goes on the certification. There are other ways to do this.

One other way is to hash the certification and just put the hash in that transaction. Another way is to mint an NFT (Non-Fungible Token) with the certification as the meta-data and send the NFT to the attendee's address from the institution's verified address.

Now, it's time to answer the questions asked:

- *What is the item that changes ownership when verifying one's educational accomplishments?*

  In the first idea, the transaction with the comment changes the ownership. In the second, the hash of the certification provides the integrity of the certification in the employee's hand. In the last idea, which is the best one in my opinion, the NFT is the item that shows ownership of the employee.

- *What data needs to be included in each transaction block?*

  In the first idea, the transaction should include the name of the course, name of the attendee, issuing date, expiration date, issuing educational

institute, and preferably the skills that were taught to the attendee. In the second idea, the hash of the certification is the only data needed to be included in the transaction. And in the last idea, the data and meta-data of the NFT associated with the certification need to be included in the transaction.

- *Will educational institutions need to be involved in validating degrees and transcripts? How does the validation process work in a distributed, blockchain environment?*

  In neither of the ideas, the educational institution needs to be involved in the validating part. The only part the institution is involved in is when they need to verify their address, and when they issue the certification in a transaction to the attendee's address.

  In this case, the validating company checks the transaction sender and ensures it's the same as the educational institution's address. Checks the material of the certification. And checks the ownership of the employee's address to make sure she really owns the address and the certification is in the right name.

- *If you're applying for a job and your prospective employers want to see evidence of your education, how might this work?*

  In the first idea, you can show the transaction that includes the data of your certification alongside your ID for clarification of your identity. You can also create a transaction to their desired address to show the ownership of the address. In the second idea, you can show them the certification and the transaction that includes the hash of your certification. Let the employer run the hash function on your certification and ensure you were eligible to get that from the educational institution. In the last idea, you can show the NFT that you own in your address alongside a transaction to their desired address to provide ownership of the NFT.